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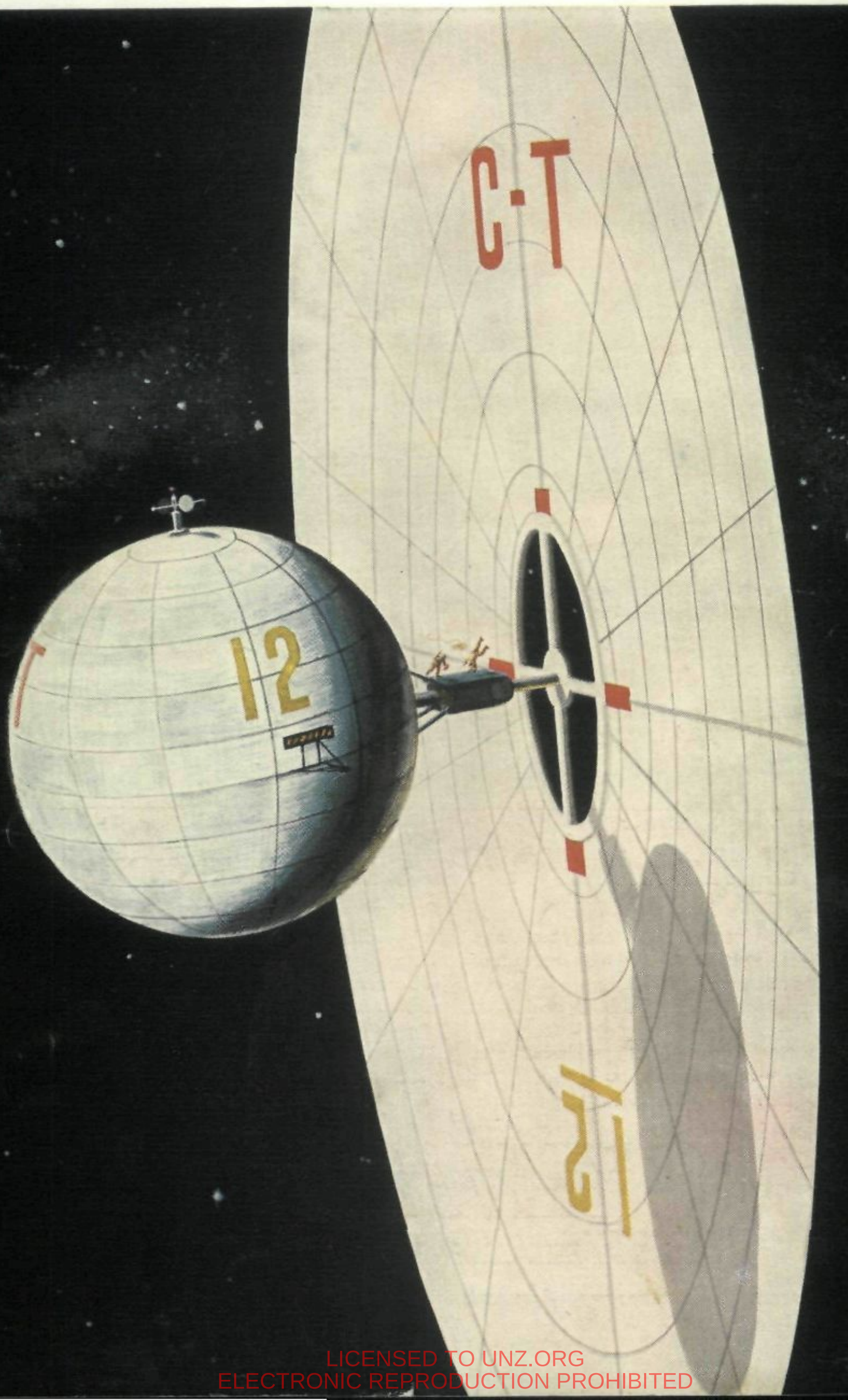
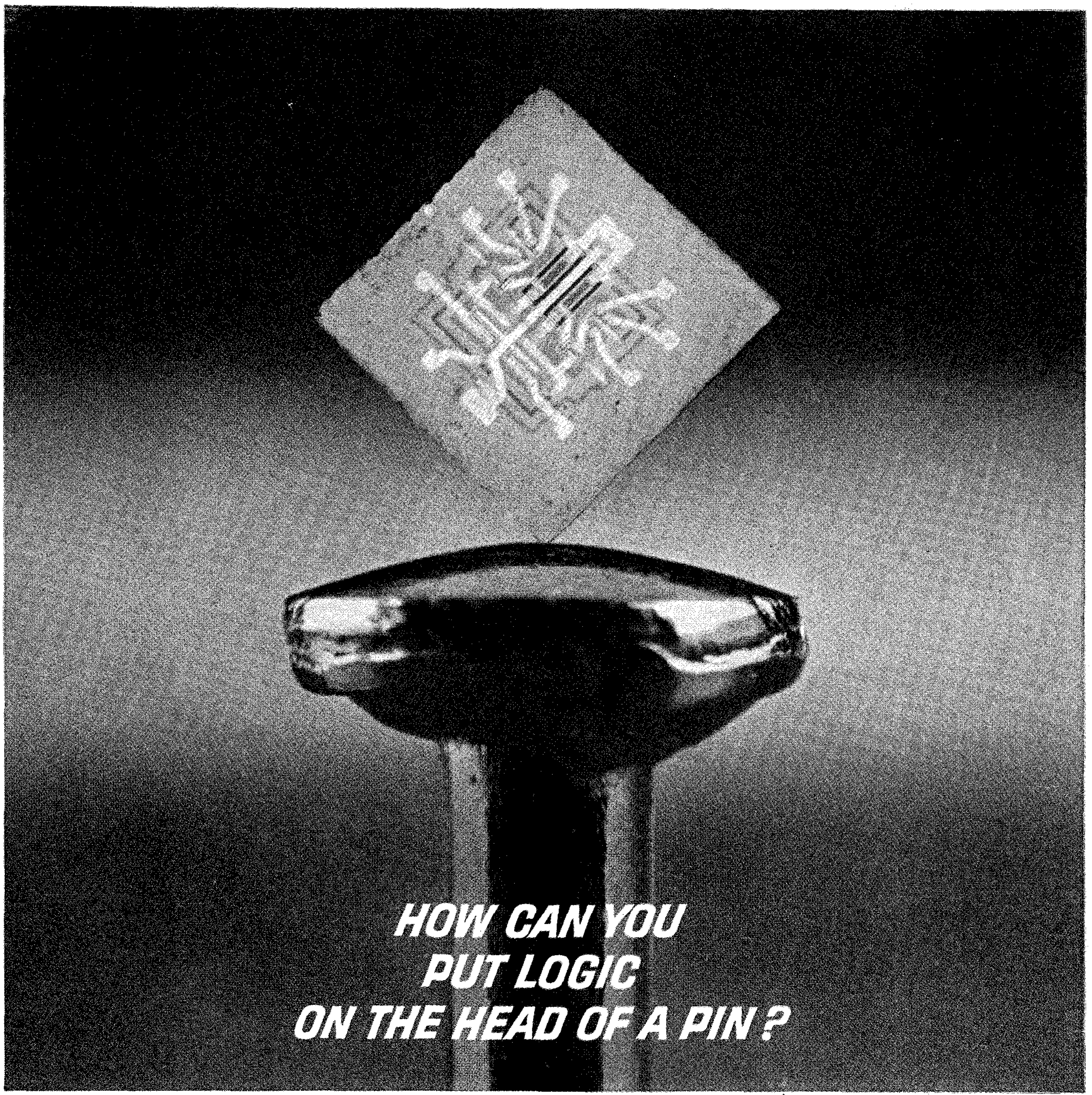
A yarn of sailing ships of space **SUNJAMMER** by Winston P. Sanders





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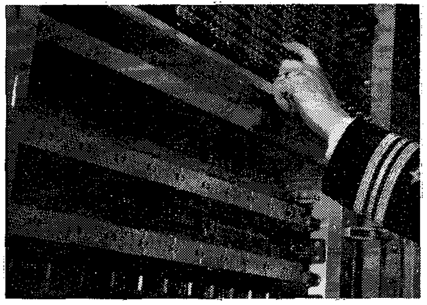

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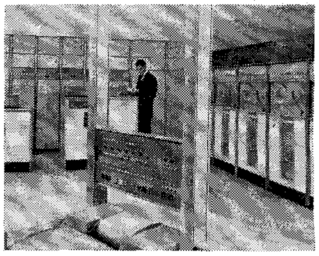

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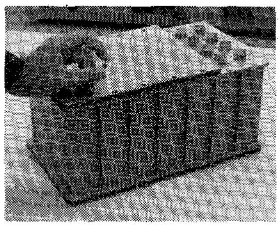

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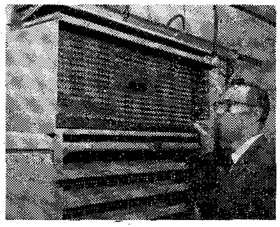

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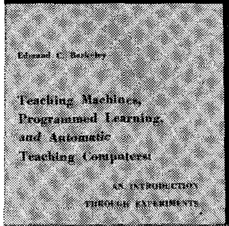
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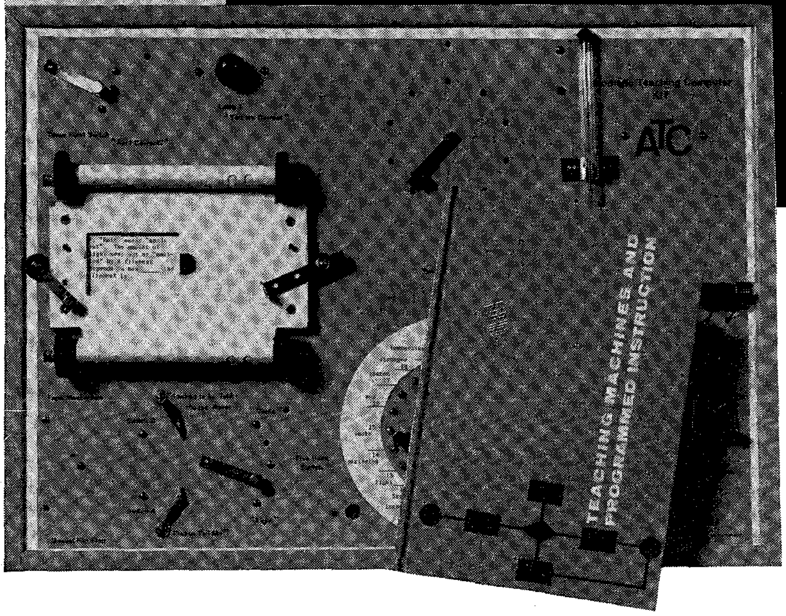

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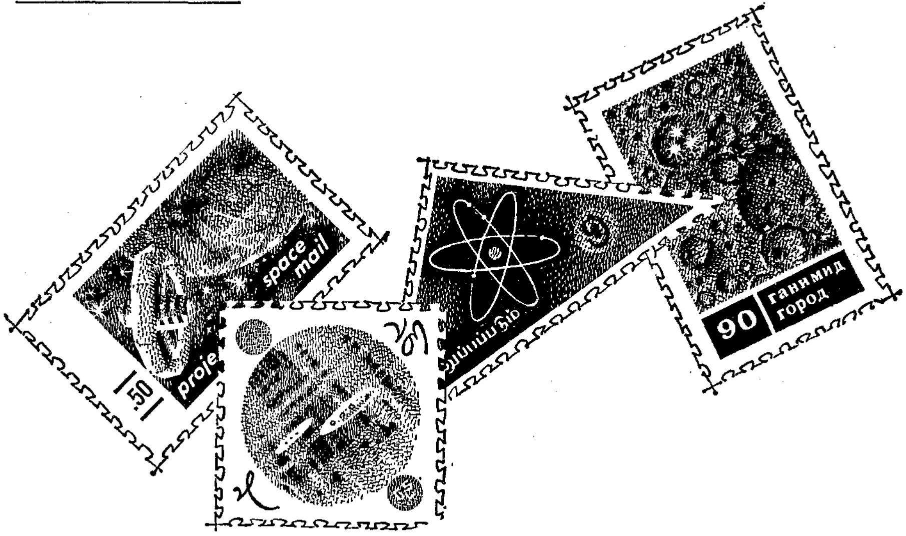

Dear Mr. Campbell:

In response to Leo Reising's question in the November Analog about Gordon Cooper's age:

1.) The time-zone and dateline system has no loopholes in it, so Gordon Cooper is legally no older or younger that he would have been if he hadn't orbited. The 23½ days he piled up while traveling from time zone to time zone were cancelled by the twenty-two times he crossed the international date line, leaving him 1½ days older just like the rest of us.

2.) At 18,000 miles per hour, he was traveling about .000027 times the speed of light, so time was running only .999999999636 times as fast for him as for the rest of us. Therefore, in his 129,600 seconds aloft he aged 47 microseconds less than we did—less than the time it takes the scanner in your TV set to generate one line of the picture.

Even this tiny amount, however, will be hotly debated by some people. Articles and letters denying the "twin effect" still appear from time to time in the technical literature—and some of them are signed by people who should know better, such as college faculty members. Curiously, the "twin effect" is one of the simplest and most elementary consequences of the theory of relativity—about ten times as easy to derive as the famous E equals M C squared—and yet people who would never think of denying the reality of the atom bomb, will deny Gordon Cooper his 47 microseconds.

One may conjecture that such people never had any emotional attachment to energy, so they don't mind making it out of mass, but that they have a very strong emotional attachment to life, and hate to see someone else getting an extension they can't have—presuming, of course, that they think of themselves as nonastronauts. The violent opposition to the "twin effect" must have some such emotional basis, because there are many noncontroversial, but equally intriguing, little surprises in relativity, none of which have effects which can be expressed in such human terms. (For example, the "Thomas precession", whereby the inertial navigator gets twisted around in a ship that travels in a loop at speeds near that of light.)

The best attitude to take toward such people was, I think, correctly suggested by P. Schuyler Miller:

Cherish them, as you would a man who believes the Earth is flat, for in only a few more years they may be extinct.

ALLAN BEEK

3128 Country Club Drive
Costa Mesa, California 92626

Tsk tsk! You're a bit harsh in your denunciation of the non-twinners. A basis of their doubting it is that if all frames of reference are equally valid—an underlying assumption of Relativity—then why can't the traveling twin say that the Earth was doing the fast moving, and had the slow time?

Dear John;

"Where I Wasn't Going" was a highly interesting story and it gave me a number of pleasant hours with a slide rule. Particularly interesting was the revival of a project I had once thought defunct. "Hot Rod" presents great encouragement for those interested in Solar power—375 million watts could do quite a bit.

For instance, the most direct factor influencing our weather on Earth is the distribution of incoming Solar radiation. Occasionally, it might be a good idea to change that distribution. My slipstick says that that energy is equivalent to that released by a four-inch rainfall over a square mile area, if continuously applied for one hour. Not much, as magnitudes go in meteorology. But, applied in the right place, it can go a long way.

The magnitudes remind me of an experiment performed by the Weather Bureau on one of the earlier hurricanes this year, while it was still at sea. In the hope of reducing its size and intensity, airplanes seeded a small area to one side of the eye with silver iodide. In theory, the resulting rain would release sufficient heat in the appropriate place to trigger a chain of events resulting in a weaker storm. In practice—after seeding, a weaker storm was observed.

It'll be a while before we can be sure that the seeding did it—that the storm wasn't about to weaken of its own accord. But—there seems to be reason to believe that that much energy can be effective in weather control. If so,

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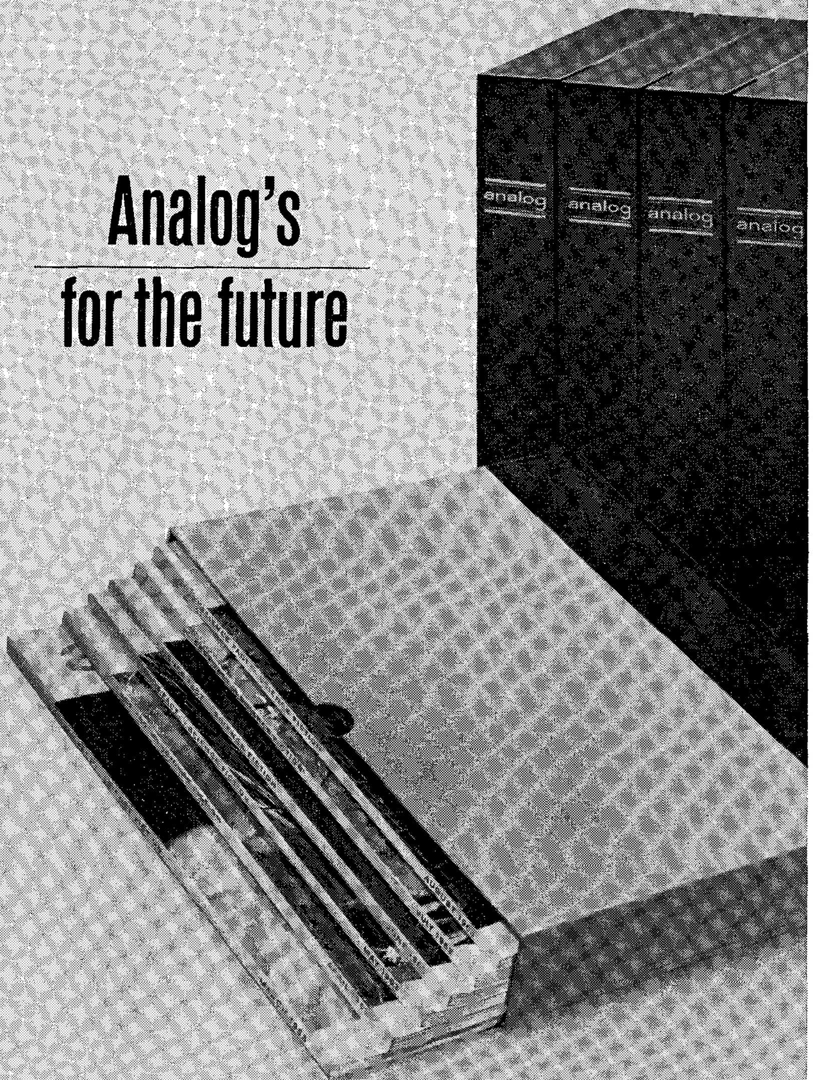

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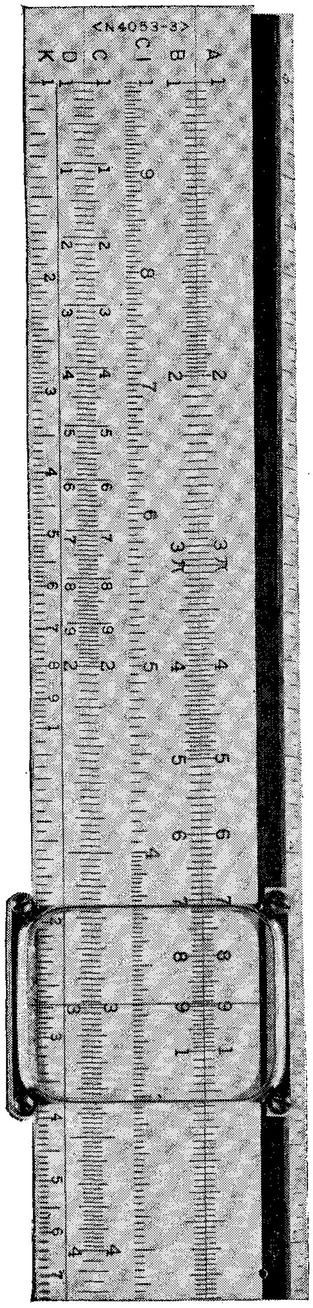

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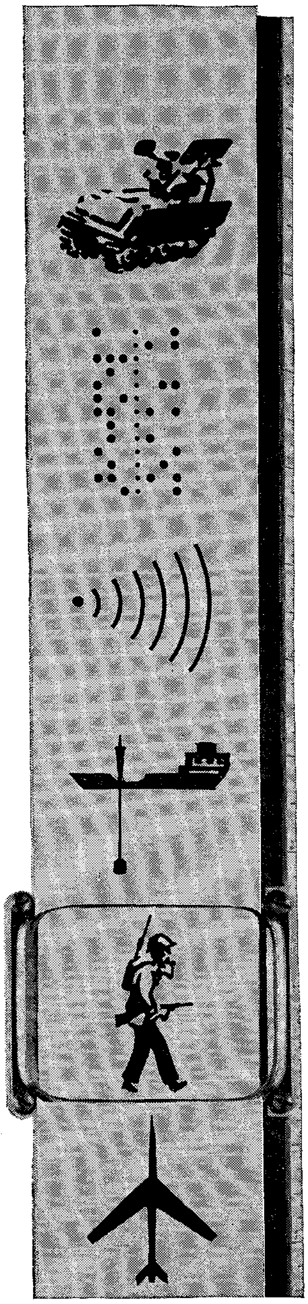

GENERAL DYNAMICS | ELECTRONICS

GOD ISN'T DEMOCRATIC

An Editorial by John W. Campbell

Over the last few years, successive decisions of the Supreme Court have reduced the areas where religious practices are permitted. Currently, the public schools are no longer permitted to offer prayers to God.

This would, I think, be somewhat startling to the Founding Fathers—and to the peoples who established this nation in pursuit of their own brand of religious freedom. The Puritans—the Quakers—the various religious groups and sects that did a very great deal to build up this nation.

If such a ruling had been handed down by His Majesty's Courts, in the Colonies, in the days of King George III, it could be expected that the American Colonists would have revolted at that point, without waiting for "taxation without representation." The large Irish population in this country came here quite largely as a result of English attempts to induce them to change their religious practices.

The fact that there has been almost no popular rebellion or loud outcry against the Supreme Court decision shows that the attitude of the people on that subject was correctly interpreted by the Court. The American people today do not want God to be so prominent in their lives; the decision of the Court was a popular one—an expression of the feelings of the people of the nation.

Perhaps we can understand the change in attitude toward God and religion in terms of the change of concepts of what is "good" and "the way it should be."

The Colonists who came over here did *not* come to set up a democracy—or any other particular form of political government. They did not revolt against the English King and *then* come over here—they were not motivated by political concepts. The Irish who came over to escape the religious persecution in Ireland were not *politically* motivated in the sense of wanting democracy vs. some other ocracy. They would have been happy to come over to a full absolute monarchy . . . provided the monarchy permitted them religious freedom. Their objection was not that the King of England wanted to be King—but that he wanted to replace the Pope.

It's important to recognize the very real distinction between political and religious motivations—for that very important division is being diluted and washed away in the modern philosophy. Politics is the area of human rule; religion is the area of divine rule.

The major rejection of God in modern societies stems from a simple fundamental: God is not democratic. He violates every basic tenet of Democracy. Naturally such a concept is intolerable in a democratic society.

The basic conception of Deity holds that the Creator is an absolute tyrant, who has such powers of detection and espionage that nothing takes place without His awareness. That His decisions are absolute, unarguable, and—by definition!—always Right and Just. That He has absolute and inescapable power of Life and Death.

In other words, that God is the ultimate in absolute tyrants, with an information system that penetrates everywhere, always, and the ultimate in police power to punish and/or reward.

This is in absolute and violent conflict with the ideals of popular democracy. God is right, even if all the people vote against Him—a violation of the basic postulate of Democracy that the vote of the People determines Right and Wrong, Good and Evil.

The fundamental of theology is that human will, human thought, and human consensus are *not* the ultimate determinant of Right in the Universe.

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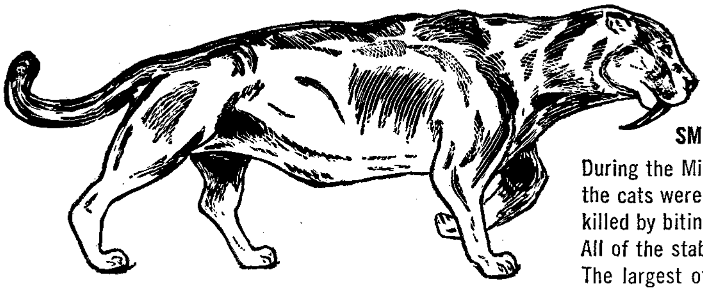
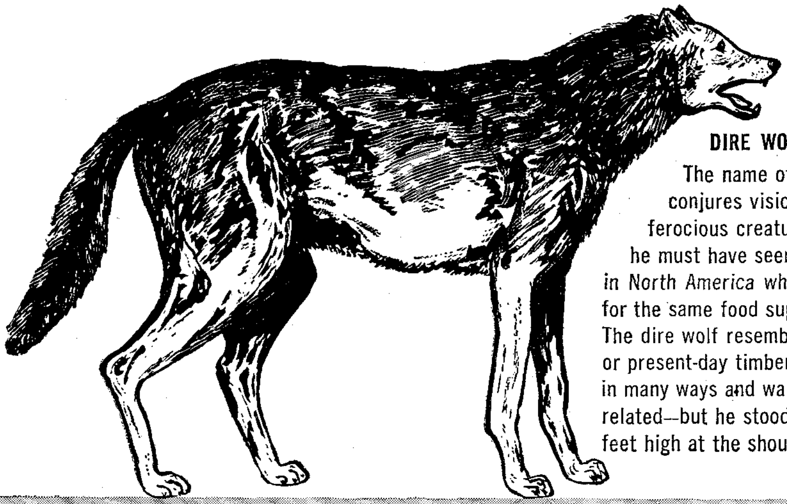


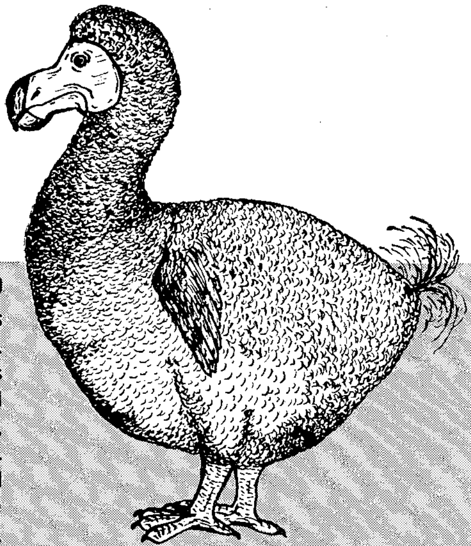
SMILODON

During the Miocene period of geological history the cats were distinctly divided into two groups, one that killed by biting and the other that killed by stabbing. All of the stabbing cats are extinct today. The largest of these sabertooth cats that left a record was the smilodon. He stood three feet high and his canines reached a length of eight inches.



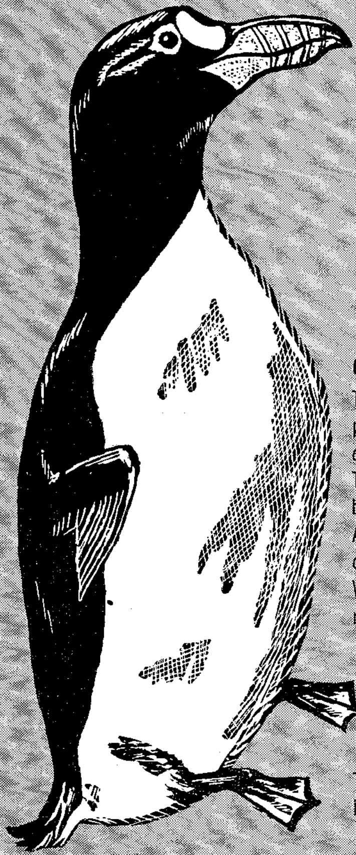
DIRE WOLF

The name of the dire wolf alone conjures visions of a ferocious creature, and so he must have seemed to early man in North America where both competed for the same food supply. The dire wolf resembled the modern or present-day timber wolf in many ways and was quite closely related—but he stood some six feet high at the shoulder!



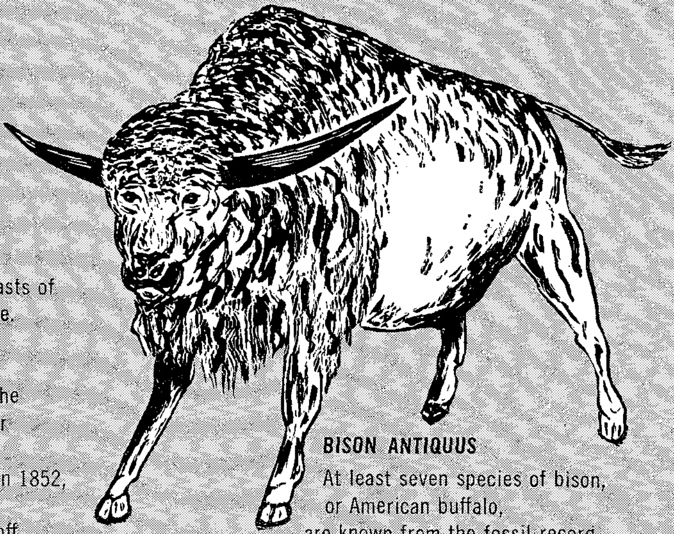
DODO

The last of the dodos and closely related soliaires vanished from the earth in the Eighteenth Century. These birds were restricted to the Mascarene Islands of the India Ocean, and like many other island birds had lost their ability to fly. Imported animals, particularly pigs and monkeys, were largely responsible. However, the habitats of the birds were destroyed by human agricultural practices as well. Today not one museum specimen in its complete form remains.



GREAT AUK

The great auks were penguin-like flightless birds of the North Atlantic. They were found along the coasts of both North America and Europe. Auks were killed for food, oil and feathers. When the birds became rare the remaining birds were killed for scientific specimens. A living bird was reported in 1852, and the following year a dead bird was picked up off the coast of Ireland. The great auk has not been reported since.



BISON ANTIQUUS

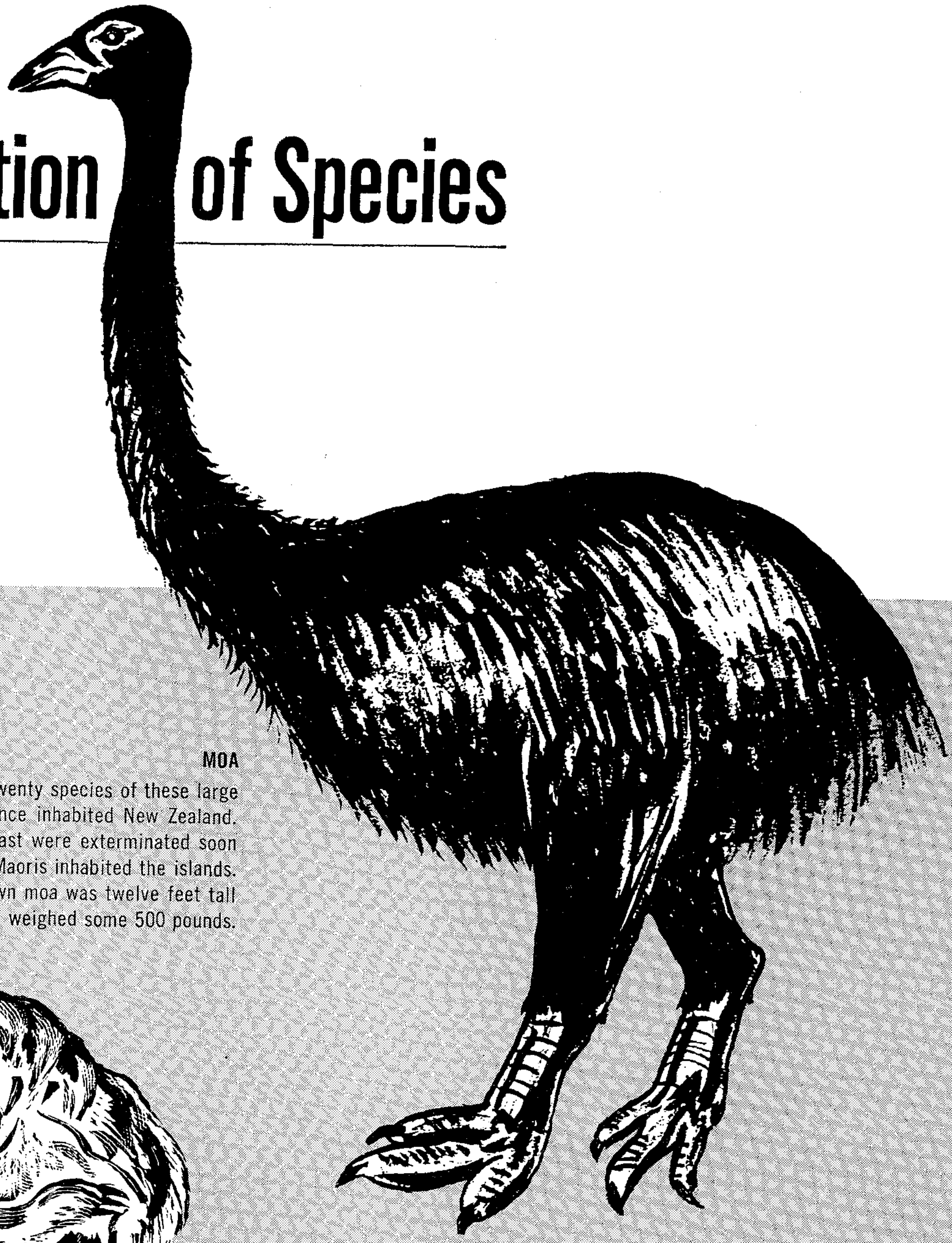
At least seven species of bison, or American buffalo, are known from the fossil record. Some were giant creatures with horns that spread seven feet from tip to tip. The part that man played in helping them on the road to extinction is uncertain but from several finds it is known that early man hunted and killed these beasts.

PHOTOGRAPHS AND DRAWINGS BY BERT KEMPERS

The dodo—the passenger pigeon—
again and again species have been destroyed.
Is it Man's doing? Or simply the incompetence of
the vanished species . . . ?

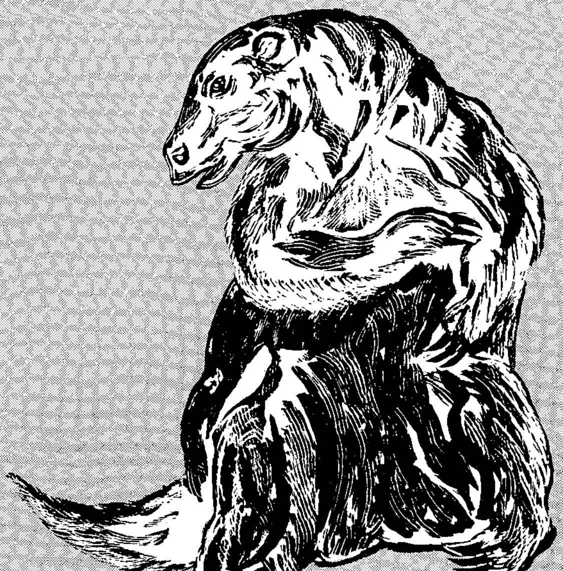
The Extinction of Species

Bert Kempers



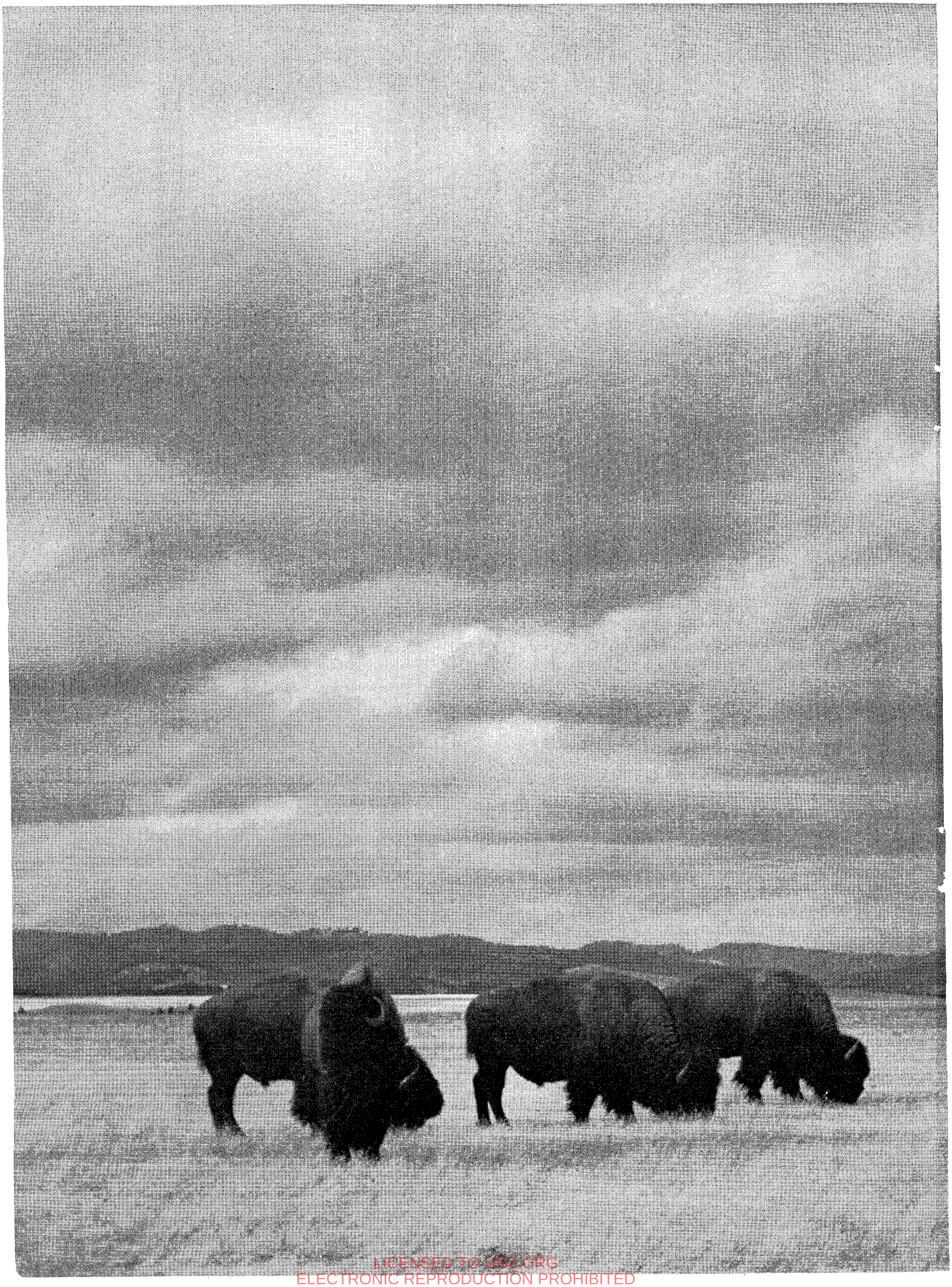
MOA

Over twenty species of these large flightless birds once inhabited New Zealand. The last were exterminated soon after the Maoris inhabited the islands. The largest known moa was twelve feet tall and weighed some 500 pounds.



GROUND SLOTH

Five to ten thousand years ago a number of giant ground sloths were found in North America. One, megatherium, reached a length of twenty feet. Nothrotherium, shown here, was about eight feet long, and was a primary source of food for early man. These sloths are thought not to have been particularly ferocious, but any prey of such a size would present problems. Early man's hunting not only was responsible *in part* for the extinct of the animals on which he lived, but probably reduced the predators as well by reducing their food supply.



The Extinction of Species

■ A solid stream of birds shot up over the forest from the south until the sky turned dark overhead. The birds settled in the great oaks and beeches until the branches, no longer able to support their weight, came crashing down, and still the birds flew from out of the south, a solid line two hundred forty miles long with an estimated total of 2,230,272,000 individuals. This was the passenger pigeon, the most numerous bird the world has ever known, as reported by Alexander Wilson in about 1810. In a little over a hundred years, September 1914 to be exact, the last passenger pigeon died in the Cincinnati zoo. The species was extinct.

Exactly what happened to send the whole species into the limbo of extinction we will probably never know, but without looking too far we can point to several factors that certainly helped to hasten the end of the passenger pigeon. Market hunting was the most obvious cause.

In 1869 close to twelve million birds were shipped from Hartford, Michigan alone. One hundred and twenty freight cars were used to carry the load. Squabs and roosting birds fell victim to smudge fires built beneath their trees. Birds were knocked down by the thousands with gunshot, stones, sticks and anything else that might be at hand. Dead birds were sold in city markets as food, and live birds were captured to use for trapshooting. When the hunters had taken what could be used the areas under the great trees were still covered with dead and dying birds. Hogs were turned loose to fatten on these remains.

Within a few years the great flocks were broken up and reduced to smaller bands, but even as late as 1878 a million and a half birds were taken from one nesting. Another ten years and only an occasional bird was to be found in the wild. Birds in captivity seldom bred and so the end of the species came fairly rapidly.

Market hunting also served indirectly to hasten the end of the passenger pigeon. The birds were highly social. They existed in large flocks, nested in flocks and traveled in flocks. When the large aggregations were broken up the pigeons stopped breeding on a scale large enough to maintain a population. The instinctive behavior of the individual was keyed to the group, and when the group ceased to exist so did the individuals.

One other factor relating to the extinction of the passenger pigeon concerns the immense amount of food required to support the great flights. Mostly the birds' diet consisted of thousands of tons of berries, fruits and nuts daily found in the vast eastern forests. When the forests were burned and cleared for agriculture the food supply could no longer support the billions of birds, and as we have mentioned the species needed numbers to maintain itself.

Life has been on this planet for close to four billion years, and during this time the world has gone through a lot of change. Not only has the crust of the earth changed physically but the life forms have changed as well. Contrary to popular opinion there is no such thing as a balance of nature. Life is in constant flux. Habitats change and so do forms of life. At least twenty-five hundred animal families have lived on the earth at one time or another. Today only about one third of these families have living representatives, and most living families were once represented by many species which through time have become extinct. The birds are a fairly recent group of animals, and yet for every single species of birds we have today more than two hundred have existed in the past.

Extinction of a species is a fact of life just as much as is the death of the individual. A species comes into the world, flourishes for a while and finally dies out, usually being replaced by more successful forms of life. A species exists because a particular environment exists, and for each species the environmental requirements are different. Those organisms best adapted to a particular habitat are the most likely to survive. The successful are not always the strongest in a physical sense. Rabbits and rodents are highly successful yet it would be difficult to consider them particularly strong or even very bright. However, they do have an ability to adapt to a wide range of habitats.

We can look at the fossil record of geology and tell a great deal about the life forms that have lived on the earth over the past four billion years. By far the greatest share of the animals and plants represented in this record are now extinct. It stands to reason, and such is the case, that the more distant in time a species vanished the more difficulty there is in discovering the reasons. The record is clear though in showing that as a group advances there is a tendency to specialize for particular environments. Such advanced species are extremely successful in the habitat for which they are adapted, but if the environment changes, as we know the world is constantly changing, less specialized forms easily replace the highly adapted. If this was always the case one might conclude that evolution should proceed at a fairly constant rate. However, the earth is not changing at a constant rate nor is evolution.

Species increase at the greatest rate when the world is going through its greatest geological and climatic changes. More habitats are being made available to new forms. Species tend to decrease, occasionally greatly, when the world is most static. During these periods of comparative quiet the more adaptable forms have a chance to increase their population and to enlarge their range. Geological time is extremely long and an extinction that looks dramatic in the fossil record may have in reality taken thousands of years.

BISON—The bison or American buffalo once numbered sixty million on the Great Plains. They were even found along the eastern coasts of the continent. Today they are found only in zoos and parks and in a few private herds.

Of course what we have presented here is quite simple and the chances are good that man will never know all the factors that have contributed to the demise of creatures like the dinosaurs and trilobites. We can do a little better with determining why many animals have vanished since the advent of man, particularly where man has had a part in helping them on their way.

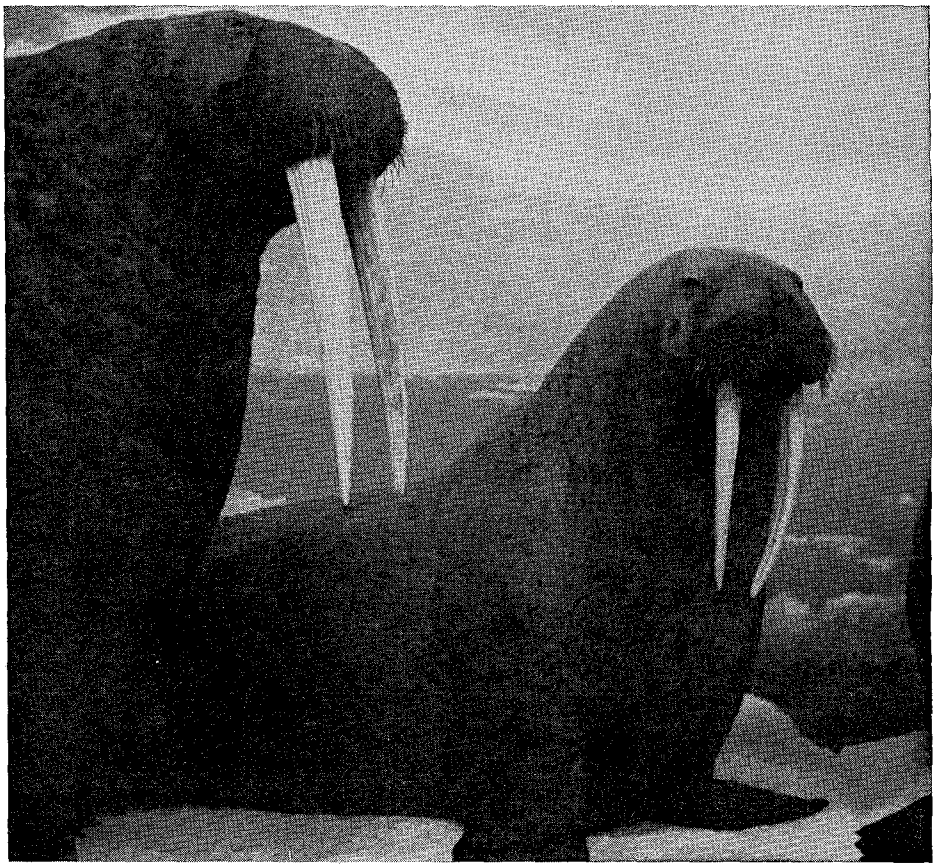
The human animal is relatively unspecialized as mammals go. He can live in a wide range of climates and eat a great variety of foods. Man has another factor on his side, his technology, through which even the most primitive individual can adapt to the most inhospitable environments. This same technology makes possible man's acquiring the specializations that have taken other creatures billions of years to evolve. As we know, the consequences for the rest of the earth's inhabitants have been considerable.

Throughout the ice age a great variety of large herbivores thrived on the North American continent, but as the glaciers receded species began to disappear. Perhaps some could not cope with the changing climate, but it is interesting to note that their expiration parallels the ascent of man on the continent and that we often find the bones of these extinct creatures associated with the habitations and fires of humans. At least three-fourths of North America's large mammals have disappeared in the last eight thousand years. The same type of picture can be painted for the other parts of the world. Man may not have been the only cause but his hunting certainly must have helped to hasten the end for many.

As recently as eight thousand years ago the families of the horse, the elephant and the camel had representatives living wild in all the continents except Australia and Antarctica. Ground sloths, mylodons, dire wolves, saber-tooth cats, giant armadillos, large tapirs and giant bison were contemporary with early man in the

IVORY-BILLED WOODPECKER
The ivory-billed woodpecker has not been reported in recent years, and no doubt is extinct. These birds, the largest woodpeckers in North America, vanished with the cutting of the southern forests.

WALRUSES
The walrus was once common in the northern seas. His numbers have been reduced by hunting, but is considered making a slow return at present. The large mammals of the northern wilderness are hardly a match for modern man and must be protected if they are to survive.



PHOTOS TAKEN AT THE DENVER MUSEUM OF NATURAL HISTORY

BIGHORN SHEEP RAM
There are several types of bighorn sheep
found in North America.
They have few predatory enemies but are vulnerable to the
diseases transmitted by domestic stock.
To exist the bighorn requires wilderness country.

AMERICAN ELK
The wapiti or American elk
once had a much greater range
than they enjoy today.
Their numbers were reduced considerably
during the late eighteen hundreds.
Where their wilderness
habitat exists, particularly in
the Rockies, today they have returned
to something like their
former numbers due to modern
game management techniques.

Americas. Throughout the world we can trace man's part in the extinction or near extinction of four hundred fifty mammals.

In the past few hundred years most of the birds that have become extinct were residents of islands. Due to a lack of competition and predators many had lost their ability to fly, a case of overspecialization which left these birds completely at the mercy of man and the animals he introduced.

On the islands of New Zealand there have existed some twenty-two species of moas. One stood thirteen feet high, the tallest bird of which we have any knowledge. In about 1350 the Maoris migrated to New Zealand. Their legends still include the moas. Doubtless for a time man and birds existed together, but a thirteen-foot bird that was fairly easy to kill would represent a considerable amount of food, particularly in a land without mammals. The consequence is that the moa is today extinct. New Zealand has a variety of other unique birds of which several are very near the point of vanishing despite rigid governmental protection.

Madagascar is another island of unique creatures. At about the time of the Crusades it was settled by Malay sailors, and since that time the fauna has paid a terrible price. At least two species of hippopotamuses, a small zebu, a giant land tortoise, two species of crocodiles, a man-sized lemur and twelve species of flightless birds are now extinct. The birds included the elephant bird which while only nine feet tall weighed half a ton and laid two-gallon eggs.

Madagascar's fauna is still unique, but each year more forest habitat is lost to burning by the human inhabitants. Changes in the island's climate have been blamed for the loss of many of the animals, a change which doubtless has been helped along by the deforestation of the land.

The mongoose seems to be an ideal creature in India where it rids human habitations of snakes and rats. With this in mind the mongoose was introduced to the Caribbean area and to the Hawaiian Islands. For a time all seemed well until the import discovered easier prey in the form of native creatures. In Hawaii the mongoose has helped to wipe out sixty percent of the indigenous bird species. In the Caribbean the mongoose not only attacked the native fauna but raised havoc with agricultural crops, particularly sugar cane. Dr. Jon Westermann working in the Netherlands Antilles has listed for the Caribbean area: 15 mammals extinct, 11 bird species extinct, 10 bird subspecies extinct and 20 species of reptiles and amphibians extinct. We might add that the mongoose in both the Caribbean and Hawaii has had help in scoring this record from other imports such as the rat and from the destruction of wild habitat by humans.

On the Mascarene Islands in the Indian Ocean there were twenty-eight land and fresh water forms of vertebrates with all but one restricted to these islands. Today twenty-four and perhaps twenty-five of these species are extinct. Most famous of the Mascarene residents were the dodos and the related solitaires. Dodos were killed for food by early sailors, but introduced mammals were the real reason for their final extinction, particularly pigs and monkeys which played havoc with the nests of the large ground dwelling birds. At least one form of dodo, the Rodriguez solitaire, lasted into the late Eighteenth Century. Live dodos were carried to Europe and exhibited in many of the major cities. Today we do not even have one complete museum specimen of these birds. The only whole specimen on record was destroyed by an overzealous house-cleaning curator in Oxford.

The Galapagos Islands off the coast of South America have long been a living demonstration of environmental selection. Here more than any other place Charles Darwin saw in a limited area the evidence to substantiate the theory of evolution. Even before the days of Darwin the fauna of the Galapagos was declining due to the efforts of man. For hundreds of years sailing ships reprovisioned themselves from the native fauna. Goats, pigs, dogs and cattle have been released on many of the islands to do as they please. Even today despite efforts by the United Nations and other agencies the slow destruction of the Galapagos continues.

The marsupial and monotreme mammals of Australia are the most ancient in origin to be found living in the world. They have been able to survive because they have had little contact with more advanced creatures, that is until the recent coming of man. Imported sheep and rabbits have now overgrazed large areas of the continent. Foxes, house cats, dogs, weasels and mongooses have all taken a share of the Australian habitat and fauna. The pouched wolf may be extinct already and the dasyurus or native cat will follow. These creatures have not been able to compete with the more advanced carnivores.

During the last four hundred years the wildlife of the continents has suffered, too. More often this has been a reduction of total numbers rather than in the extinction of species, but the extinctions have occurred as well. Of all the world's major land masses North America leads in the number of recent extinctions. The reason for this is, of course, that the human density has dramatically increased within the past few centuries. Not only has this density increased but the humans themselves have been better equipped for the destruction of the wilderness.

The first to go in North America were the creatures of the eastern seaboard where the settlers concentrated. Eastern forms of the turkey, elk, bison, wolf, caribou and prairie

KOALA—The koala is an arboreal marsupial from Australia where its diet is restricted to the leaves of certain eucalyptus trees. All of the marsupial mammals in Australia have had a difficult time competing with the more advanced mammals that man has imported.

PHOTO TAKEN AT THE DENVER MUSEUM OF NATURAL HISTORY

chicken are all gone. Two species, the giant mink and the Labrador duck, vanished completely during the last century. Both were never very numerous in recent times, and they were more than likely headed for extinction before Europeans entered the continent.

The Carolina parakeet, North America's only native parrot, vanished around the turn of this century. The last captive died in 1914, the same year as the last passenger pigeon. The little parrots were at one time common with a range that extended from the eastern coasts to the Rocky Mountains. They were trapped and shot for meat and sport and were killed as pests to agriculture.

The Carolina parakeet was only one victim of the market hunters. Hundreds of species were taken and wagon loads of dead birds were hauled to the cities to be sold as meat. In 1872 two hunters killed five thousand Eskimo curlews in one evening's shoot. Today the Eskimo curlew is so near to extinction that years go by without a single bird being seen. Almost every shore bird in America had its numbers reduced by market hunting. Even song birds were taken, and as late as 1913 robins sold for sixty cents per dozen.

Besides the meat hunters there were plume hunters who took birds mainly for their feathers. Later the feathers would show up as a part of feminine fashion. One of the birds hardest hit by plume hunters was the American egret whose estimated numbers in 1902 were reduced to eighteen individuals. Flamingos, spoonbills and many other colorfully feathered creatures also came close to extinction. Largely due to the efforts of the Audubon societies the remnants were saved.

Fur-bearing mammals also were reduced for the sake of fashion. The west was opened because of the trade in beaver pelts used for top hats. While the beaver has recovered over much of its former range others, like the marten, mink, otter and fisher are still rare in the wilds.

Generally the animals of the west and far north have fared better in North America than those of the east. They have been able to exist because large areas of wilderness habitat have remained relatively unchanged. If this wilderness were to vanish, as it very well might under the pressure of civilization, these animals, too, would disappear from their wild existence. The wolf, the grizzly bear, the wolverine, the American elk, the bighorn sheep and the musk ox all require room to live. They reproduce rather slowly, and they are poor competitors when faced by man.

The story of how the bison or American buffalo was reduced from sixty million great shaggy beasts roaming the Great Plains to five hundred forty-one individuals is known by every school child in America and in Europe. It is the classical example of wildlife's struggle for existence in the face of man. Since the low point in 1889 the buffalo has never really been in danger of extinction, and today thousands are to be found in protected parks and in private herds throughout the world.

There are other prairie species, however, that are today fighting for an existence in the face of a habitat that is rapidly being destroyed. The prairie chickens, especially Attwater's form, are losing ground, and like their eastern relative, the heath hen, will no doubt become extinct before long. The prairie dog is going too along with many of its associating species like the burrowing owl, the plains kit fox and the black-footed ferret.

The whooping crane, largest of the world's waterfowl and the tallest bird in North America, for many years has maintained a population of only thirty some birds, They reproduce slowly at best and for the most part lack the wintering grounds that would be required for a larger population.

The ivory-billed woodpecker has disappeared with the cutting of the southern forests. When their habitat was gone they seemed no longer capable of competing with other woodpeckers. The Everglade kite will also join the ranks of the vanished soon, only about fifty remain, because they feed on one species and one species only of fresh-water snails. The kite with its typical bird of prey look is considered fair game by many a man with a gun, but in the end it will be the draining of the swamps and the loss of a food supply that will undo this remnant of a wilder America.

The California condor is vanishing because its native home is one that seems to attract a great many human Americans. The last remaining condor refuge lies just outside of metropolitan Los Angeles, and while the birds have complete protection within their refuge it is impossible to keep them restricted to this area. Their reproductive rate is slow and they are no match for civilization.

In contrast to the story of animal extinction so far presented there are many animals in North America whose numbers are increasing. Deer are one of the best examples of this. Almost without exception there are more deer throughout their former range than ever before. This is because man has learned to manage them almost as if they were livestock. This, too, can present problems because a given piece of land can only support so many animals. When the deer or other game species get too numerous they are easy targets for disease and starvation, resulting in the loss of many individuals. The solution to this has been controlled harvesting of surplus individuals, and most hunting seasons are based on these surpluses. Similar stories can be told for many other game species including the elk and the pronghorn antelope.

North America is not the only major continent that faces continued problems with its wild animals. In Africa the quagga, Burchell's zebra and the blanbok are extinct. The barbary lion and the white-tailed gnu exist only in captivity. Across the dark continent the vast game herds are

continued on page 83

SUNJAMMER

WINSTON P. SANDERS

The difference between "nothing" and "practically nothing" can turn out to be most exceedingly practical, because anything whatever is an intolerable contaminant in nothing. And if that sounds like nonsense—read on and find out!

"Ol' Jonah was a transporteer, he was, he was.
Ol' Jonah was a transporteer, he was, he was.
A storm at sea was getting mean,
So he invented the submarine.
Bravo, bravo, hurrah for the transporteers!"

Lazing along a cometary orbit, a million-odd miles from Earth, herdship *Merlin* resembled nothing so much as a small bright spider which had decided to catch an elephant and had spun its web accordingly. The comparison was not too farfetched. Sometimes a crew on the Beltline found they had gotten hold of a very large beast indeed.

Stars crowded the blackness in the control cabin viewports, unwinking wintry points of brilliance; the Milky Way cataracted around the sky, the Andromeda galaxy shimmered mysterious across a million and a half light-years. The sunward port had automatically closed off, refusing so gross an overload for itself and its men. But Earth was visible in the adjacent frame, a cabochon of clear and lovely blue, with Luna a tarnished pearl beyond.

Sam Storrs, who was on watch, didn't sit daydreaming over the scene as Edward West would probably have done. He admitted there were few better sights in the System, but he'd seen it before and that wasn't his planet yonder. He was a third-generation asterite, a gaunt, crease-cheeked, prematurely balding man who remembered too well the brother he had lost in the Revolution.

Since there was no work for him at the moment, he was trying to read Levinsohn's "Principles of Modern Political Economy." It took concentration, and the whanging of a guitar from the saloon didn't help. He scowled as Andy Golescu's voice continued to butcher the melody.

"King Solomon was a transporteer, he was, he was.
King Solomon was a transporteer, he was, he was.
He shipped his wood on a boat for hire,
'Cuz a wheel's no good without a Tyre
Bravo, bravo, hurrah for the transporteers!"

"Ye gods," Storrs muttered, "how sophomoric is an adult allowed to get?"

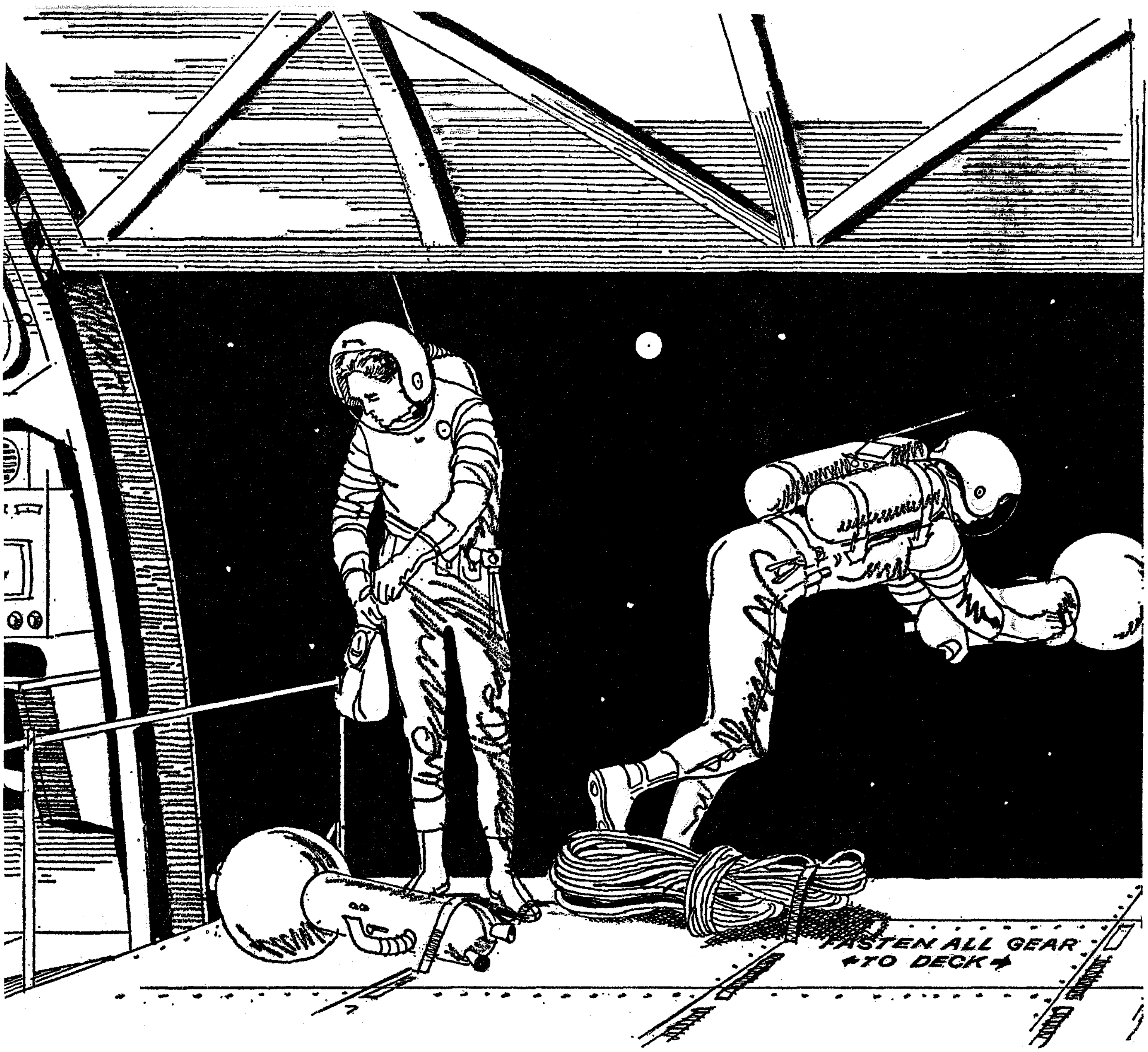
He reached for the intercom switch, with the idea of asking Golescu to stop. But his hand withdrew. Better not. It'd be a long time yet before their orbit brought them back to Pallas and the end of their patrol, even though the run would be finished under power. Crew solidarity was as important to survival as the nuclear generator.

And Andy's O.K., Storrs argued to himself. *He just happens to be from Ceres. What do you expect of anyone growing up in that kind of hedonistic boom town atmosphere? It was different for me, out on the Trojans.* His mouth bent wryly upward. *There puritanism still has survival value.*

No doubt the company psychomeds had known what they were doing when they picked Storrs, West, and Golescu to operate *Merlin.* You needed a balance of personality types . . . Storrs wondered about asking for a transfer when they returned to base.

"Ulysses was a transporteer, he was, he was . . ."

The long-range radio receiver buzzed and flashed a



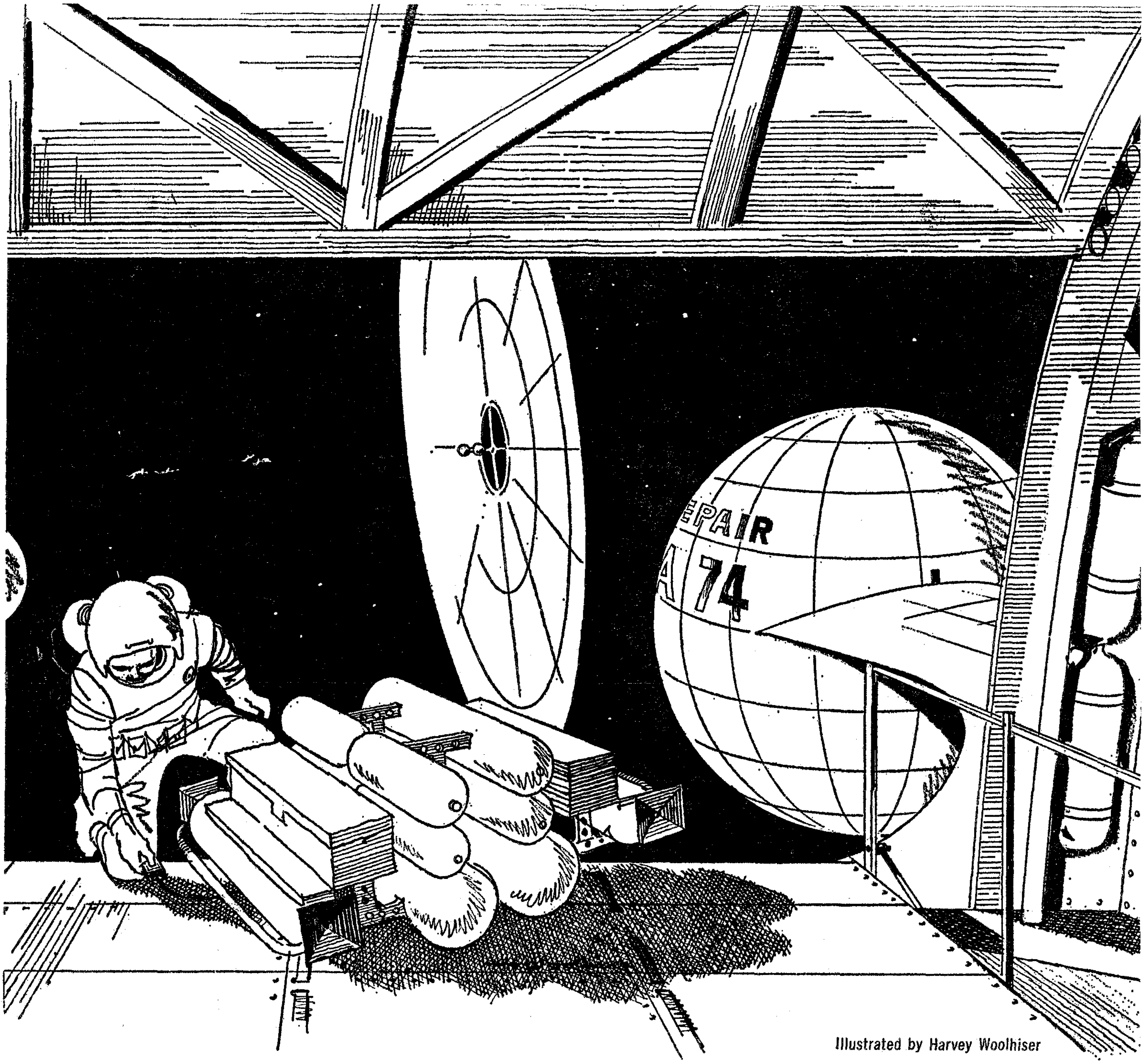
red light. Storrs jerked in his seat. What the hell? That was no distress signal from a sunjammer. A wide-beam call on the common band—He sucked in a breath and snapped the Accept switch.

"... *He stopped at Calypso's isle for beers,*
And didn't proceed for ten more years ..."

The loud-speaker seethed with cosmic static. A voice cut through. "International Space Control Central calling Beltline Transportation Company maintenance ship number 11, computed to be in Sector Charlie. Come in, number 11 ... International Space Control—"

"Here we are." Storrs recollected his dignity. No Earthling was going to say that a citizen of the Asteroid Republic didn't know the rituals. "Maintenance ship 11, *Merlin* out of Pallas, Storrs on duty, acknowledging call from International Space Control Central," he intoned. "My precise position and orbit are—" He read the figures off the autonavigator screen.

There was no need for him to adjust the transceiver web outside the hull. Its detector antenna had already fixed the direction of the incoming beam, and now the maser swung itself about to face squarely that way. The ship counter-rotated a trifle. Storrs touched the controls. The generator purred, power ran into the Emetts, the field drive dissipated angular momentum into the general mass-energy background of the universe.



Illustrated by Harvey Woolhiser

"Columbus was a transporteer, he was, he was.
Columbus was a transporteer, he was, he was.
They put the royal crown in pawn
To shut him up and move him on.
Bravo . . ."

Golescu must have noticed the motion all at once, to judge from how his singing cut off. Storrs flipped the intercom open. "Got a call from Earth," he said hurriedly. "I don't know why, but assume condition red."

Feet clattered on the decks. Storrs' skin began to prickle. What the blazes was going on? Earth's SCC knew approximately where *Merlin* was, of course. Every herdship's orbit went on file in every traffic monitoring station throughout the System. If an orbit was changed, that news was also beamcast between the planets. But it was strictly an in-case precaution. The messages which drew a herdship off her path had always been automatic: beeps from a sailship whose interior sensors had registered trouble.

Always—until now?

His signal had leaped forth. Half a dozen seconds later it had reached the relay stations orbiting Earth. The operator stopped chanting, heard Storrs out, and began to talk back.

"International Space Control Central acknowledging reply from maintenance ship 11. Stand by, please. I'm going to switch you over to the main office, groundside."

A low whistle drifted from the intercom. Golescu, posted at the engine, had heard. West came in the door, puffing from the climb up the companionway. He was a large man, his hair grizzled, face and stomach sagging a bit with middle age. But he was still highly able, Storrs admitted, and decent for an Earthman. To be sure, it helped that he was British. The Revolution had been fought mostly against North Americans.

"Must be something big, eh?" West said. "Headquarters and all that." He settled himself in the navigator's chair.

"Hello, *Merlin*," said a new voice on the radio. It was a deep baritone, clipped but heavy with authority. "Evan Bailey speaking, assistant director of ISCC's Bureau of Safety." This time it was West who whistled. A message from so high an official of the World Interplanetary Commission, relayed straight from his personal desk—!

"A serious emergency has come up," Bailey went on. "There's no time to lose. Calculate an interception curve for sailship number 128, that's one-two-eight. Assume that you start acceleration at maximum thrust in, well, fifteen minutes. As soon as possible, anyhow. Is there by any chance another craft like yours reasonably near? We have no record of one ourselves, but there might have been some filing error. And you'll want every piece of help you can get."

"No," Storrs answered. "Nothing. The herdships are few and far between. You're lucky we happen to be this close to you right now."

That was not entirely coincidence. The orbits of the maintenance ships were planned to keep them never too distant from the great vessels of the Beltline. Some of the best mathematicians in the Republic had worked out the formulas for optimization of paths followed by sail and power craft: an intricate, forever changing figure dance across half the Solar System.

Storrs sat up straight. "So what's the trouble?" he finished.

West's fingers had been playing a tattoo on the keys before him. A tape popped out with the information he wanted. "One-two-eight," he murmured. "Yes, here we are. Cargo of . . . I say, this is an odd one. She's carrying eight hundred metric tons of isonitrate from the Sword's Jovian-orbit plant. Right now she's approaching Earth, only about six thousand miles away, in fact. There were no indications of trouble during her passage."

"Isonitrate what?" Golescu inquired over the intercom.

"An important industrial chemical," West explained. "Alkali complex of 2,4-benzoisopro—"

"Never mind," Golescu said. "I'm sorry I asked. Uh, everything's O.K. with our engines, if the gauges aren't liars."

Bailey had hesitated a while at the other end. Storrs could visualize the man, plump in a lounger behind several acres of mahogany desk, sweating with fear that something might happen to interrupt his placid climb through the bureaucracy. His words, when they came, wavered slightly.

"The sun is going to flare."

"What?" Storrs jumped to his feet. An oath from Golescu bounced through the intercom. West paused at his work, hands frozen on the keys. After a second he grunted, like someone struck a body blow, and went back to setting up the computation of thrust vectors.

"No!" Storrs protested. "Can't be! This is a clear weather season." His eyes went past the stars, sought the one blank port, and clung there.

"My office issues more storm warnings than you perhaps realize," Bailey told him. "The big flare cycles are predictable far in advance these days, but indications that a small, short-lived one is going to occur are often not observable more than forty-eight hours ahead." His tone grew patronizing. " 'Clear weather season' means only a period in which there will be no major flares and the probability of minor ones is low. Still finite, however. You asterites don't have to worry about solar radiation, out where you are, so perhaps you forget these details. Around Earth, we're highly conscious of them."

You smug planethugger! Storrs hung onto politeness with both hands. "I know the details well enough," he said stiffly. "After all, Mr. Bailey, every man aboard a herdship holds a master's certificate. I was only shocked. It seemed unbelievable that a cargo of isonitrate would be shipped, if there was any measurable chance of a flare while the vessel was inside the orbit of Mars."

The beam went forth. While they waited for reply, West said in a mild voice, "Call it an unmeasurable chance, then, Sam. The chap's right, you know. Solar meteorology is still not a completed science. It's either assume the hazard, knowing you'll lose an occasional ship, or else have no space traffic whatsoever. A coincidence like this one was bound to happen sooner or later."

"But for crying in the beer!" exclaimed Golescu from aft. "Why couldn't it have happened to a cargo of metal?"

"It does, quite often," Storrs reminded him. "Metal isn't hurt by radiation. Remember?" Sarcastically: "I've heard you gripe so often about how dull these cruises are most of the time. Well, here's your chance for some action."

Bailey had hung fire again. A rustle, penetrating the dry star-whisper, suggested he had been searching through a report prepared for him. "The flare is expected in about twelve hours," he said. "Predicted duration is three hours. Estimated peak radiation rate in Earth's vicinity is four thousand roentgens per hour. As you know, that will cause the isonitrate to explode."

Storrs exploded himself. "*Twelve hours!* You must'a known about it at least two days ago! Why didn't you alert us then? It'll take us two of those blithering hours just to make rendezvous!"

"Take it easy there, Sam," West said *sotto voce.* "Some of those high-caste officials are even touchier than that isonitrate."

As if in confirmation, Bailey's words turned hard. "Kindly watch your language, captain. The delay is unfortunate, I admit, but no one is to blame. The prediction was issued in the usual way, and records were checked as per regulations. The nearness of 128 was noted. However, it is an unmanned craft. You can't expect an ordinary clerk to know the danger involved in its particular cargo. That was only pointed out when the data reached my office for the routine double check. And then a policy decision had to be reached. We haven't the lugger capacity to unload so much material in time. It would have been simple for us to send a crew out to bleed off the gas and thereby save the sailship from being destroyed. But a staff physicist showed that this was impossible. I was informed of the dilemma the moment I came back from lunch, and immediately ordered that contact be made with the nearest herdship. What more do you want, man?"

Storrs choked. *Though I should have expected this,* he thought in a distant part of himself. *There isn't a government of any importance on Earth these days that isn't based on some version of "social justice." So of course independent thinking, conscientiousness, ordinary competence have gone by the board.*

He unpinched his lips, sat down again, and said, "Well, Mr. Bailey, you might as well order that crew of yours to jettison. We can't do anything more than that ourselves. Or have you some alternative suggestion?"

Waiting out the transmission lag, he heard Golescu say, "Whoof! Looks as if there's going to be more excitement than I bargained for."

West uttered a small chuckle. "Weren't you caroling about the mad, merry life of a transporteer?"

"Shucks, Ed, I was only practicing my act. Those blooming glamour boys from the scoopships and the prospector teams have been latching on to all the girls back home. Something's got to be done for our kind of spaceman."

"That gas must positively not be released so close to Earth," Bailey stated. "It would contaminate the entire inner region, causing damage estimated at ten billion dollars. You may valve it out when you are no less than a hundred thousand miles from Earth sea level and/or basic Lunar surface. That's a direct order, by my authority under this jurisdiction and the Interplanetary Navigation agreement. Are you recording? I repeat—"

"Judas priest!" Golescu yelled. "You expect us to haul away a bomb?"

A humming silence fell over the ship. Storrs became acutely aware of how the stars glistened, the power plant and ventilators murmured, the deck quivered ever so slightly with energies. He felt the roughness of his coverall on his skin, which had become damp and sharp-smelling. He stared at the meters on the pilot panel, and they stared back like troll eyes, and still the silence waxed.

Bailey broke it. "Yes. Unless you have some other plan, we do expect you to remove that stuff to a safe distance. Under terms of your company's franchise for Terrestrial operations, it is your responsibility to dispose of this object in a manner not injurious to the public well-being. What's the problem, anyway? According to your rated thrust, you should be able to get the sailship's cargo section far enough away in four or five hours."

"The hell you say," Storrs barked. "We can't use full power on that big an outside load. Too much inertia. We'd rip our hull open. One third of max'll be risky enough. And we've got to uncouple the sail first, to get proper trim—at least two hours' work." Desperately: "You're giving us no safety margin. You know as well as I do, flare time can't be predicted much closer than an hour. If it happens sooner than you claim, and the radiation sweeps over us before we can disengage and get clear—and *that* takes time—the explosion will destroy us. And you'll still have space contamination. Plus a lot of ship fragments."

"Also people fragments," Golescu chimed in. "We got a legal right to refuse an impossible job, don't we?"

"But not an improbable one," West said. His gaze went to Earth. "I did want to see Blighty again."

"You will," Storrs said. "We're not going to commit suicide for the benefit of a lot of Earthlings."

"Like me, Sam?" West asked softly.

Bailey came back on: "You are not expected to act without due precautions. You can safely tow at the end of a cable several miles long, can't you?"

"Know how much mass that adds?" Storrs snapped. "But never mind. The fact is, our class of ship isn't designed for cable tows. We hook on directly by geegee. A cable 'ud tear us apart, just like hauling under max thrust."

"Wait a bit," West interrupted. He had skippered a European League ship before he reached compulsory retirement age and Beltline made him an offer. Asterite law based retirement on medical data rather than the calendar. "I know what sort of boat can do a cable tow. Not an ordinary tug—I mean the kind that starts a sailship off. It hasn't enough power, considering how fast we'll have to work. But a North American Navy tug of the *Hercules* class would serve. I should think four of them could be hitched on without their drive fields interfering. Or perhaps you can borrow some *Kubilai* types from the Asians. With that many engines at work, we can cover the required distance in ample time. Have 'em there when we arrive, will you? We'll make the attachments and supervise the whole job."

Again the wait was longer than transmission lag would account for. At last Bailey's voice came, so small and shaken that the noise of the universe nearly drowned it. "I . . . guess you don't know. Both fleets are out near Venus. Joint maneuvers."

After a moment, assuming briskness like a garment: "We'll do what we can. Alert the International Rescue

Service. Commandeer whatever else we can find that may be of help. I can't make any promises, with so little time to go through channels. But I'll do whatever is humanly possible."

"Amoebically possible, you mean," Storrs said. He managed to keep it under his breath. Shaking himself, he answered aloud:

"We'll get started now. Have to fold our radio-radar net. Acceleration forces would wreck it otherwise. When we've made rendezvous with 128, we'll call you on the short-range 'caster. Stand by for that. Over."

He didn't wait for a response, but snapped off transmission as if the switch were Evan Bailey's neck.

Once the web had been pulled in by the appropriate machinery and acceleration had commenced, there was little for men to do until the end of the run. But doctrine required that Storrs remain on the bridge during his pilot watch—in which time he was also the captain. He roused from a period of angry lip-gnawing and said, "How about fixing us some chow? God only knows when we'll get our next chance to eat, and he isn't passing the information on."

"Right-o." West heaved his bulk out of the navigator's chair and started aft.

His body dragged at him as he went down the companionway and along the passage to the galley. There was, of course, no sensation of the ten gravities under which *Merlin* hurtled Earthward. The Emetts acted equally on every object inboard, and normally to the internal gyrogravitic field which furnished weight. But sometimes he wished the latter weren't kept at the standard Earth gee. One of the few things he really liked about the asteroids was the sense of buoyancy on a rock where pull generators had not yet been installed. It was almost like being young again.

Oh, stop kidding yourself. Also stop feeling sorry for yourself. He squeezed into the galley and got to work. Herdships always carried a gourmet assortment of food, as one means of keeping up morale on their long lonely cruises. West enjoyed exploring the potentialities, whenever his turn came to cook. And he had the honor of his country to defend as well, against that ancient canard about English cuisine. Even now, he built the sandwiches as elaborately as any Dane. But his mind was elsewhere.

How much risk are we obliged to run?

Under the law, a transporteer crew had the right to refuse a task as being too dangerous. Afterward they would have to face a board of inquiry, and Beltline might well decide to fire them. *(Would I honestly mind that?)* In this particular instance, though, they'd probably be cleared. *Merlin* represented a considerable investment. The company's cost accountants would not be happy if she were lost. In fact, if the isonitrate was simply released into space, a moderately expensive sailship could also be saved.

However, that might well embroil Beltline in legal action, considering how much economic damage Earth would suffer. No one could hold anyone responsible for the sun's picking this day to flare. But a lawyer could argue that Beltline's agents had made no effort to rescue the situation, and therefore a whopping claim should be paid. Earth's SCC might be put under pressure to rescind the Terrestrial franchise. A protracted court battle, even if won, would doubtless prove more costly than two ships and three men.

West shook his head. *That's another thing I don't like about the Republic. They can brag as much as they want about free enterprise, but it still amounts to the rawest, most cold-blooded kind of capitalism. Maybe the welfare states on Earth have gotten stuffy and over-bureaucratized —nevertheless, we don't let the devil take the hindmost!*

He put the food and a pot of coffee on a tray and went forward. Storrs was busy with a slide rule and some bescribbled sheets of paper. He grabbed a sandwich with an automatic "Thanks," and chewed as he worked on. Rations, to him, were only fuel; West and Golescu never looked forward to his turn in the galley.

"What're you doing?" the Englishman asked.

"Trying to figure if we can't boil off some of the liquid as we tow, so gradually that it won't affect space too much, so fast that we'll shed noticeable mass. But hell and sulfur! I don't have the thrust parameter. Not knowing what sort of tugs we'll have available—How about hitching that Bailey character to the load and cracking a whip over him? A big wire whip hooked up to five hundred volts AC."

West achieved a smile. "What'd he push against?"

"Hm-m-m, yeah, that's right. O.K., we'll get extra reaction by cutting Bailey into small pieces—very, very small pieces—and pitching him aft."

West's look moved out to Earth. The half disk was becoming a crescent as *Merlin* approached the spaceward side, but it was also rapidly growing. He traced bands that were clouds, white in a summer sky, the mirror sheen of ocean and the blurred greenish-brown coast of Europe.

"Don't be too hard on the man, Sam," he said. "When a world gets as crowded as that one there, you have to operate by quite a rigid system. Within the system, I presume he's doing his best."

Storrs spoke an obscenity. "A machine is judged by its output. How's your precious system performing in this mess?"

"Oh, forget the political arguments. There's England."

Storrs' features softened a trifle. "Kind of tough, huh? Passing this close to your wife and not getting a chance to see her."

West thought of the little house in Kent, where the hollyhocks would now be in bloom, so tall that they overshadow the windows. He shrugged. "I knew what I was letting myself in for when I signed up as a transporteer."

Five years on the Beltline. I've waited out not quite three of them so far.

He stared spaceward. Illimitable emptiness gaped at him, from here to the frost-cold stars. Out there plodded the sailships, unmanned, driven by the sun, slowly but cheaply carrying nonperishable cargo from the mineral-rich asteroids and the chemical-rich Jovian atmosphere to an Earth grown gaunt in natural resources, returning with such manufactured goods as the Republic had not yet gotten around to producing for itself. And there, too, flitted the herdships on the interweaving orbits, *Apollonius of Tyana, Simon Magus, Hermes Trismegistus, Morgan le Fay, Gandalf*, a score of them with radio webs outreaching, listening until an automaton cried for help. It was a chilly concept, somehow. He shivered.

Two more years.

After that, the real retirement, with Mary in flowering Kent. He didn't yet know if his decision had been right. Gardens, green hills, four hundred year-old homes, were not anything a man could afford on a space officer's pension. Not with today's land values and taxes. But the pay scale in the asteroids was fantastic, the Republic did not levy on income, and Earth needed outplanet exchange so badly that every Terrestrial government also exempted such earnings from impost. The house would be mortgage free by the time he came back to Mary, and there would be enough in the bank as well for them to do everything they once promised themselves.

On the other hand, they paid for it with five years when they might have been together.

And if he got killed, they never would collect the goods. Mary would have to move in with one of the kids, and—

West picked up the tray. "I'll take Andy his lunch," he said.

Storrs nodded absent-mindedly and returned to his calculations. No doubt they were his form of escape.

Passing through the tiny saloon, West heard the plink of Golescu's guitar. Words bounced after:

"*George Washington was a transporteer, he was, he was.*
George Washington was a transporteer, he was, he was.
He paddled across the Delaware
To find the buck he'd shot-put there.
Bravo, bravo, hurrah for the transporteers!"

He entered the workshop just forward of the bulkhead which sealed off the nuclear generator. A man was always supposed to stand by here under acceleration, in case of trouble. But *Merlin* had yet to develop any collywobbles, and Golescu was sitting by. His chair was tilted back against the big lathe, his feet on the rungs and his instrument on his lap. He was a squat, dark young man with squirrel-bright eyes.

"Hi," he said. "Also yum."

West set the tray down and poured two cups of coffee. "By the bye," he said, "I'm not too well up on American folklore, but wasn't it the Potomac that Washington threw the dollar over?"

"Don't ask me. My parents came to Ceres direct from Craiova."

"Wherever that may be . . . D'you want to go back and visit there some day?"

"Whatever for?" Golescu rose. "Hey, those sandwiches look great."

"Thanks. I'm afraid my heart wasn't in them, though."

Golescu made a face. "Yeah! I should hope not."

"I mean I had the wind up so about this confounded affair—"

"Wind up?"

"Forget it. A Briticism." West shook his head. "D'you know, I can't help pitying children who've never felt wind or rain."

"Everything I hear about weather makes it sound more dismal," Golescu said through a mouthful. "Me, I feel sorry for kids that never get to ride a scooter with the whole universe shining around them."

He chewed for a while, then blurted, "Hey, what *is* this problem of ours, Ed? There's no hazard in jettisoning boiloff cargo, not to anybody except the insurance carrier. Is there? It's not like when 43's sail rotation went crazy. I still get nightmares about that one! Why can't we just valve off the isowhatsit, adjust the sail to whatever new track is right, and get back inside *Merlin's* rad screen field long before the sun burps?"

"Space contamination," West said. "Weren't you listening?"

"Yeah, but I didn't get it. Eight hundred long tons of gas aren't going to make any dent in all that hard vacuum."

"The devil they aren't. You'd still need instruments to detect the difference, but—Well, let's figure it out." West extracted paper, pencil, and a slide rule from a workbench drawer. "At a distance of six thousand miles from sea level, Earth has an angular diameter of, um, call it forty-three and a half degrees. Adding in the surrounding volume of space that concerns us, we can say about fifty-seven and a half. If we jettison, nearly all the gas will arrive there; the molecules have an Earthward component of velocity. Between the upper atmosphere limit and, say, a fifteen-hundred mile radius from the surface, the concentration of matter will go about ten molecules per cubic centimeter, if I remember the figure rightly, to . . . good Lord, I have trouble believing this myself! Over fifteen thousand per cc!"

"And so? That's not going to cause any friction worth mentioning."

"We'd actually do better to let the ship blow up," West mumbled, still bent over his work. "In that case the gas will scatter every which way, and maybe only two per cent or so will come near Earth. That's still intolerable, though."

"Hell, it'll dissipate again."

"Not for months, I'll bet. Remember the trapping effect of a planetary magnetic field. But even a few hours of that kind of contamination means the biggest economic disaster since the Nucleus failed."

"How come?"

"The equipment in orbit, man! There're a couple of hundred assorted devices near Earth these days. Photocells, for instance, directly exposed to space. Monitoring instruments. How d'you think solar meteorologists get their data? One of the primary sources is a set of ultraclean metal surfaces with characteristic responses to various radiations—automatic spectrometers sending continuous information to the computers Earthside on the relative output of UV, X-rays, the whole band of solar emission. What do you imagine bombardment by so many metallic-complex molecules, and adsorption, are going to do to the work function of these metals? How about the weather satellites, with their electronic insides open to space, shielded against ions but not against vacuum? Or any cybernet constructed along those lines, controlling some such elaborate apparatus as a radio relay or a Mössbauer clock—or even a manned station." West slapped the bulkhead, so hard that it rang. "Bailey said the loss would be ten billion dollars. But I don't believe he was counting in the indirect effects. He probably hasn't the nerve!"

Golescu put down his coffee cup with great care and jammed hands into pockets. A muscle jumped at the corner of his jaw. "I get you," he said.

West discovered that his appetite was gone. *You know,* it occurred to him, *the economic repercussions might even be such that my own government will have to put a surtax on everyone who has any money left, simply to feed the unemployed. Mary could lose that house yet.*

"Remembered an errand," he said thickly. "I'll be back later to fetch this tray." He left fast, stumbling at first.

You don't scramble into a full suit of space armor, no matter what the hurry. You wriggle and grunt your way in. Helping Storrs secure a knee joint, Golescu remarked, "And to think, when I was a kid, I figured it would've been real romantic being one of King Arthur's knights."

"Shut up and keep going," Storrs answered.

Maybe I am, though, in a way, Golescu's mind continued. *Or at least it's a line to feed the ladies. That dragon outside is fixing to spew some mighty hot fire.*

The intercom speaker in the locker room resounded with West's voice from the bridge: "*Merlin* calling International Space Control Central. Come in, Central."

The reply was abrupt. "International Space Control Central acknowledging call from *Merlin.* Stand by for relay from Earthside office."

"So they finally woke Bailey up from his nice nap," Storrs said.

"Nah." Golescu finished assisting and went back to clamping his own boots. "He finally came out of conference. Formulation of policy directive in re Cigars, Standard Officers' Issue of and Correct Angle in Mouth of."

"Relax, you chaps," West said. "You ought to know how hard it is to raise a spaceship of some given type on short notice."

"You mean they don't keep Rescue Service craft in orbit, with full crews?" Golescu asked, astonished.

"Oh, they do that much," Storrs admitted grudgingly. "But—"

"Bailey here," said the speaker. "That you, *Merlin?*"

"No, just us chickens," Golescu muttered.

"West speaking, now in command," said the Englishman. "We're near rendezvous with 128. I haven't picked up anything else on the radar. You do have tugs here, don't you?"

This close to Earth, there was no time lag that human senses could register. "I'm sorry, no," Bailey said. It was hard to tell whether his tone was curt or merely defensive. "Unfeasible."

"What?" Storrs cried. Golescu watched the sallow face turn quite bloodless. His own heart skipped a beat or two. He got violently busy with his armor. Above the clatter of metal, he heard West:

"But the Rescue Service has tugs."

"I know," Bailey said. "Believe me, Captain West, this decision was not arrived at lightly. The unfortunate fact is, as I told you before, every ship that could tow your load on a cable at a high enough acceleration to give us any chance, is out on maneuvers. You must be aware that a standard rescue tug does not use cables and is not built for them. Just like your own vessel. A cable would add a great deal of dead weight, for no purpose when it is so easy to clamp on directly with a gyrogravitic grapnel. Nor do the tugs have more power than your type. It isn't necessary, in any foreseeable situation. A disabled ship need only be gotten into a stable orbit to wait for a repair crew. This merely happens to be so improbable a situation that it could not be foreseen."

"But three or four to help us—"

"How will you attach more than one hauler by geegee to a load as small in volume as this? If we had a ship available, so big it could take the container aboard, there would be no problem. Its radiation screen would protect the cargo. But we don't. The Navy transports are gone. So is the *Lunar Queen.*" Bailey's voice turned cold. "With the asterites taking over so much interplanetary shipping, and with so much Terrestrial bottom destroyed during the war, those are the only such craft left to us."

Silence extended itself. Golescu could imagine West, alone before the pilot board, his sad eyes resting on the stars and unreachable Earth, methodically trying to think his way out of the trap.

"Build a frame around the gasbag, you Oedipal clotbrain!" Storrs snarled.

"Sam, please," West begged. To Bailey: "Forgive us. We are rather overwrought here, you understand. Er . . . what about it, though? A skeleton of girders around the bag, giving a large effective surface to which several tugs could grapple."

"How long would it take to build?" the man on the ground countered. "You know how ticklish and specialized a job construction in orbit is. The sun would flare hours before any such project could be finished." Something like eagerness came into his speech. "The Rescue Service is prepared to take you aboard one of its own units. You need only detach the sail and other excess mass, hook onto the cargo section, and operate your ship by remote control from ours. Quite safe."

"'Fraid not." West said. "Herdships don't include equipment for unforeseeable cases either. All we could do by remote control is turn the Emetts on and off. Which is insufficient. A ship coupled to an outside mass makes a highly unstable system. We'll need a pilot on deck, to correct every time it starts hunting."

He sighed. "Bring your ship around, though. Only one of us has to be aboard."

Storrs' face had gone from white to red. "Why one of *us*?" he shouted. "It's your problem, Earthling!"

There was a thump that might have been Bailey's fist striking his desk. "Yours, sir, yours," he threw back. "Read the Interplanetary Navigation Treaty, or your own franchise. Beltline sent that cargo here, and until delivery has been made, Beltline is responsible for the consequences. If someone has to risk a ship and, yes, a life, why should it be this Earth you despise so loudly?"

"Gentlemen—" West expostulated.

Bailey's tone smoothed over. "I agree. This is no time for recriminations. Do understand that our decision was a hard one. I sympathize with your feelings. We shall all pray for you. And don't forget, if the, um, the outcome is unfortunate, my own position will be seriously jeopardized."

Storrs swallowed something and clanged his faceplate shut.

"Very well, then," West said tiredly. "We'll proceed as best we can. Dispatch that ship of yours. Maintain contact with us. Let us know if you come up with any better ideas."

"Certainly. Good luck, *Merlin*. Over."

"Over and out, Earth."

Golescu's earplugs registered Storrs' suit radio: "I don't want that one's good wishes."

"Me, I'll take every scrap of luck that's offered me," Golescu said. "I'm not proud." To the intercom: "How long till rendezvous, Ed?"

"About ten minutes," West answered. "Better run off your suit checks fast."

"A checked suit . . . in space?" Golescu closed his own faceplate.

By the time he and Storrs had verified that everything was in order and had clumped their way to the air lock, deceleration was ended. They stood unspeaking while the chamber exhausted for them. The outer door opened, a cup that brimmed with stars.

Golescu touched the controls of his geegee unit and went forth. Suddenly he was no longer encased in clumsiness, he flitted free as an Earthdweller can only be in dreams. *Merlin* dwindled to a toy torpedo. Blackness surrounded him, lit by twelve thousand visible suns.

He did not look at his own sun. It could have struck him blind before it struck him dead. And Luna was occulted from here. But Earth lay enormous to one side, a dark ball with one dazzling thin edge and a rim of refracted light. There was not much poetry in his makeup, but he found it hard to remove his gaze from the planet.

Storrs' broadcast voice sounded in his receiver. "We're clear, Ed. Stay where you are till we finish."

"Right-o," said West. "Your velocity relative to target is—" He reeled off the figures.

There was scant need. As Golescu swung about, the sailship, which had been at his back, loomed like another Earth.

He had snapped down his glare filter. The stars vanished; he could now have stared Sol in the eye. The disk of the sail reflected with nearly the same brilliance. Protected, he saw it as a great white moon, growing as he sped across the few miles between. The suit radar controlled a series of beeps to inform him of vectors and distance. It made a dry, crickety music for his flight. Not exactly the Ride of the Valkyries, he thought—scarier. He found himself whistling soundlessly, the words running defiant through his head.

"Chuck Lindbergh was a transporteer, he was, he was.
Chuck Lindbergh was a transporteer, he was, he was.
His lonesome song was in the news:
The Spirit of St. Louis Blues.
Bravo, bravo, hurrah for the transporteers!"

"Hey, Ed," Storrs called. As an afterthought: "You, too, Andy."

"Yes?" West replied.

"I've been considering. The way this job has developed, it's most likely an impossible one."

"We must try."

"Sure, sure, sure. But listen. It won't do us any good to watch telescopically for the commencement of that flare. The highest energy protons don't travel at much under the speed of light. And there's that whopping probable error in the time prediction. One hour in advance, let's cast off, and to hell with those precious satellites."

"Sorry, old chap, no. *Merlin's* going to stay coupled and hauling till the end of the run . . . or her. I'll pilot. We can dispense with the engine watch. You and Andy wait aboard the rescue ship."

"Stow that," Golescu said. "What kind of guts do you think we have?"

"You're both young men," West said dully.

"And you're a married man. And I got a reputation to keep up."

"Ease off on the heroics, you two," Storrs said. "If it comes to that, maybe we can cut cards. Meanwhile, every mile we can drag that canned stink spaceward will help some, I suppose—so let's get on with it."

The sail now nearly bisected the sky. Four and a half miles across, the foam-filled members that stiffened it marching across the field of view like Brobdingnagian spokes with its slow rotation, that disk massed close to a hundred tons. And yet it was ghostly thin, a micron's breadth of tough aluminized plastic, the spin as necessary as the ribs to keep it from collapsing backward under the torque at its edge.

For while the pressure of sunlight in Earth's neighborhood is only some eighty microdynes per square centimeter, this adds up unbelievably when dimensions stretch out into miles. The sunjammers were slow, their shortest passages measured in months, but that vast steady wind never ended for them; it weakened as they drove starward, but so did solar gravity, and in exact proportion. They cost money to build, out in free space, yet far less than a powered ship; for they required no engines, no crews, simply a metal coating sputtered onto a sheet of carbon compounds, a configuration of sensors and automata, and a means to signal their whereabouts and their occasional needs. Those needs rarely amounted to more than repair of some mechanical malfunction. Otherwise little happened on the long blind voyages. Micrometeorites eroded the sails, which must eventually be replaced; cosmic rays sleeted through the carrier sections, unheeded by unalive cargoes—

Or solar flares blew them to hellangone, Golescu thought.

First time it's ever happened, he reminded himself. *Probably the last time too. Unique event. I'm privileged to be on hand for it. What'm I offered, ladies and gentlemen, for my share of this unique privilege?*

He noticed, with a slight surprise, that he wasn't afraid. Well, nothing very dreadful was going to take place for several hours yet. Except a lot of hard work. Dreadful enough. *I should'a tried for scoopship pilot. Still, you got to make your money somehow, and the pay here is good, to compensate for having nothing to spend it on. A few more cruises, and I'll have me that stake to go prospecting. Now* there's *the life!*

Passing near the middle of the disk, he noticed the hub in which the sunjammer kept its transmitter and its navigational sensors. Then he had slipped around behind. The monstrous moon turned black for him. He raised his filter and saw it become dim blue with reflected starlight.

Carefully, he moved with Storrs toward the opposite hub. It was linked by a universal joint to a large, dully gleaming cylinder which held the motors. Those drew their power—they didn't need much—from solar batteries in the sunward hub, and used it to control rotation and precession of the sail according to instructions from the pilot computer. For the sunjammer must tack from orbit to orbit, across the ever-radial energy wind. Gravitation helped only on a trip from the outer to the inner System; and even then the reduction vector was a continuously changing thing.

Golescu felt the slight jar as his boots made contact with the precessor hull. They clung, and he rested weightless. The motors beneath had been turned off on radio command from *Merlin.* He stood for a moment letting his eyes complete their adjustment to the wan illumination.

Storrs landed beside him. "Come on," said the impatient voice. "Get the lead out of your rectifier. We'll need every bit of two hours to unhitch the cargo section as is."

"Yes, sure." Golescu began unstrapping the collapsible tool rack from his shoulders. He and his companion were hung about with equipment like a robot family's Christmas tree.

"I haven't worked on one of this type very often," he admitted. "You'd better be straw boss." He grinned. "I'll be the straw."

Storrs made a sour noise.

The gas carriers were a pretty special model at that. Their cargoes must be shaded by the sail, lest temperature go above critical, the liquefied material boil and the containers rupture. The standard form of sunjammer used a curved sail controlled by shroud lines, which pulled rather than pushed the load. Such an arrangement permitted a considerably larger light-catching area and proportionate freight capacity. The drawback was that maintenance crews on a standard vessel had to begin with erecting a shield between them and the reflector . . . if they didn't want to be fricasseed in their spacesuits.

West called: "Ed speaking. I had to drop behind. The sail was screening me off from you. Everything in order?"

"Just fine," Golescu said. "Apart from having an itch on my back that I can't scratch, and more work ahead of me than I'd dare load on any machine, and a prospect of getting blown to nanosmithereens, and no women in sight, and hell's own need for beer, I can't complain. Or, rather, I can, but it wouldn't do much good."

"Don't you every stop chattering, Andy?" Storrs grumbled.

"Let him be, Sam," West advised. "We each need some outlet."

"Well . . . yes. Mine's hating Earth, I suppose. North America, anyway. You Britishers are still human." Storrs carried his tool rack to the farther end of the cylinder and set it in place with what should have been a crash but naturally wasn't. "Those Americans—The muckheads don't even have their regular gas boats out here unloading some of this cargo."

"They can't," West said. "Remember what Bailey told us. They haven't the capacity. Once the container was put in orbit, two or three luggers would have spent a couple of weeks shunting the contents groundside."

"Still," Golescu said, "seems to me that every pound they can save right now would help. Make matters that much less serious if this thing does blow."

"Wouldn't make any significant difference, in the short time available," West said. "And it'd hamper our operations."

"But doesn't the consignee want his stuff? I checked, and this load is worth eight million dollars F.O.B. That works out to quite a bit per pound."

"I just told you, Andy, salvage would interfere with the really important job—keeping those satellites functional." West's tone became thoughtful. "Y'know, if we do succeed, there ought to be rather a nice bonus for us."

Golescu snorted. "That's about as likely as the Milky Way curdling. Beltline ain't gonna be happy. Sure, they'll have gained good will Earthside. But they'll have lost a sunjammer and a shipment. Somebody'll have to make the loss good. If it's an insurance company, as I suppose . . . well, imagine what the premiums are going to go up to!"

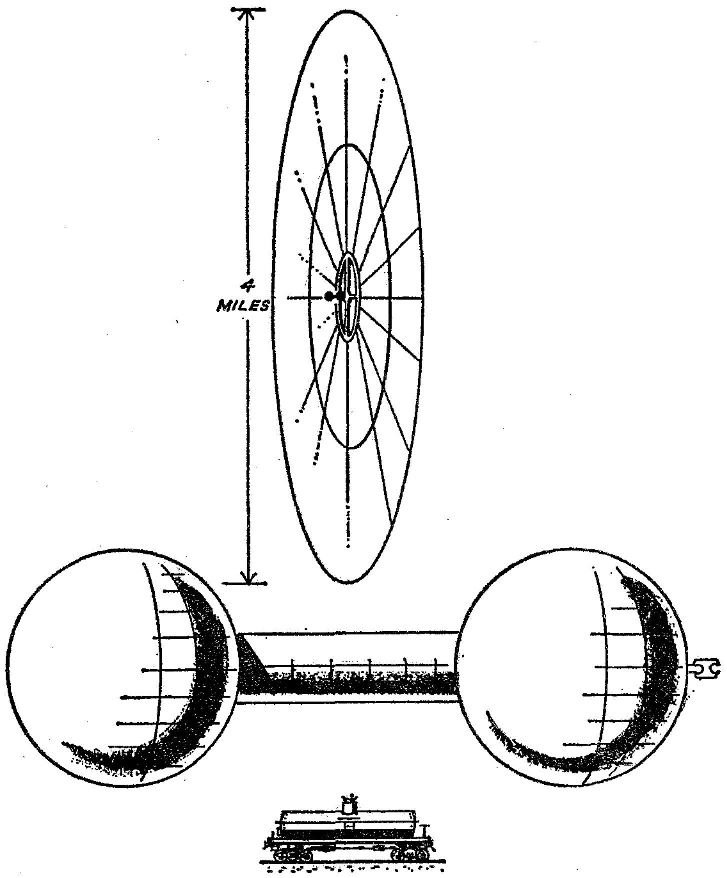
"We might get a pat on the back," Storrs agreed, "and then the Old Man will call us in privately and tell us that the next time we do so poor a job of chestnut pulling, he'll put us on portside duty, latrine detail."

West sounded shocked. "Are you serious?"

"Uh-huh," Golescu said. "Asterites can't afford excuses. If you don't cut the mustard, you're apt to be dead, and so are your mates."

"But I have to cut it for Earth," Storrs said between his teeth.

Golescu's frame was now also in place. He flitted "up" to install a battery of floodlamps, "down" again to plug them in. Light glared, harsh and undiffused, on the spot where the work must be done.



That was the heavy U-joint connecting precessor with cargo section. The latter was also illuminated in part. Hitherto it had appeared only as a circle of blackness. Now, beyond the framework that held it in place, ponderously counter-rotating, the translucent bag glimmered a deep, angry red.

It was not very large to contain so much hell . . . or so much money, Golescu reflected. Space-cold and liquefied under high pressure, the isonitrate occupied a sphere only some ten yards in diameter. Its substance, even the metal atoms, had been reaped from the atmosphere of Jupiter—a chill great star shining in Gemini, two firefly moons visible beside it, treasure house and grave of more asterites than Golescu cared to think about. They were brave men, too, who manned the orbital station where the Jovian complexes were processed into isonitrate. An accident there would not be quite like a nuclear warhead going off, but the difference was academic.

Yet Earth needed those energy-crammed molecules, as the starting point for a dozen chemical syntheses. And Earth was willing to pay. Demand evoked supply, including a supply of men to keep production and the Beltline moving.

Golescu began to unclip his tools and hang them on the rack where they would be ready to hand. A sense came to him of his own muscles, but not merely in arms but in legs and belly and neck, constantly interplaying with centrifugal and Coriolis forces to hold him in balance on this free-falling shell. That led him to notice how the breath went in and out of his nostrils, tasting of recycler chemicals, and how his heart pumped the blood slowly around the intricate circuit of veins and arteries, and how that made an incessant tiny throb in his ears. He was getting hungry again, and had not lied about wanting a beer . . . ah, cool tickling over his tongue, yes, that was why the asterites must sell to Earth, they hadn't yet succeeded in brewing decent beer themselves . . .

"Sam," he said, "I've been thinking."

"About time," Storrs grunted.

"No, really. I never wondered about it before. But if this junk is so irritable, how come we can ship it at all? Why doesn't cosmic radiation set it off?"

Storrs sighed. The lamps threw the lean features behind his faceplate into highlights and black gullies. "If you'd spent more time in school learning your science, and less chasing women and beating that guitar—Oh, well." He relented. "I'm no chemist myself, but it's fairly obvious. Isonitrate complex is actually quite reasonably stable. It's plain to see that Xrays and electrons don't bother it. And the probability of a high-energy nucleus breaking up enough molecules to start a chain reaction must be extremely low. Trouble right now is, we're due for one all-time concentration of high-energy nuclei."

"Uh, yes. If we could screen them off—maybe mount a field generator on the frame—"

"Where'd you get hold of one that puts out the right size and shape of field, in the time we've got? I daresay they will be provided in future. Hindsight versus foresight, as usual. Now hurry it up there."

"Wait a bit," West hailed them. "Just got a signal from the Rescue Service ship. Want me to relay to you?"

"Might as well," Golescu said. "For the laughs."

A new voice, accented English: " 'Allo, *Merlin*. International Space Commission Rescue Service cutter *Rajasthan*, commanding officer Villegas speaking. Come in, *Merlin*." Golescu searched for the newcomer, but it must still be only a spark, lost among the stars.

"Acknowledging," said West shortly, and identified himself.

"We 'ave your position and path, *Merlin*. Do you plan to maintain same for t'e present? Yes? T'en we will adopt t'e same orbit, with thirty-kilometer lag. Unless we can do something to 'elp."

"Tell him to send over anybody he's got along who has sailship experience," Storrs said. "With an extra man or two, we'll finish sooner."

West passed the idea on. Villegas hemmed for a moment before answering, "I am most sorry, but we 'ave no such persons with us. You should 'ave asked for t'em before."

"We assumed you weren't infinitely dunderheaded," Storrs bit off. "Our mistake."

"Don't blow your gaskets, Sam," Golescu counseled. "Sunjammers are oddball craft. Earth hasn't got any. How could they know?"

"Beltline's got offices and personnel on Earth! Didn't that Bailey snerd even consult them?"

"Maybe no one was on hand except a secretary. This boat wasn't due to make final approach for another two, three weeks. Maybe all our people who could be of any help are out fleshpotting around Earth and not tuning in any newscasts. I hear they've got some mighty fine places there for that sort of thing."

The byplay had not been relayed. Villegas was saying: "No use to send any of my engineers, yes? T'ey 'ave not t'e special skills. By t'e time t'e men you want could arrive, yours will 'ave finished uncoupling and you will be under acceleration, I trust."

"Well, you'll take mine aboard first," West said. "We only need a pilot here for that maneuver."

"I never thought of Ed as the hero type," Golescu remarked. He squatted to fit a wrench around a bolthead. "Shall we oblige him?"

"What a dilemma," Storrs said acridly. "If I do, I'm a coward. If I don't, and we cut cards, I might end up risking my neck for Mother Earth."

"Come off that shtick, Sam. The war's over, or hadn't you heard? Besides, we may reach jettisoning distance before the flare pops. It's just as likely to be later than prediction as earlier. Or . . . you know, in armor, with a strong metal shield around him, a man might even survive the explosion. There's no air to carry blast. When *Merlin* breaks apart, he could be tossed into space in one piece."

"Sure. Into four thousand roentgens per hour. That means nine minutes for a lethal dose. The other ship isn't going to find him in any nine minutes, chum."

"Hm-m-m . . . true. Damn! What we need is a pocket size rad screen generator. Or something very thick to hide behind—"

Golescu's words cut off. He stared before him, into the icy light of Jupiter, until its after-image danced through his vision.

All the stars danced.

"What's eating you now?" Storrs growled. Get to work."

Golescu's yell nearly shattered his own eardrums. Its echoes were still flying around in his helmet when West cried, "What is it? I say, what happened? I'm coming, be there in a few minutes, hang on, boys!"

"No . . . wait . . . hold everything," Golescu stammered. "Not so fast. We're O .K. Better than O. K."

Storrs closed gauntlet fingers on the other man's shoulderpieces and shook him. "What's the matter, you clown?"

"Don't you see?" Golescu howled. "We can save the whole shooting match!"

Words flew between sunjammer and herdship. The decision was quickly reached; a spaceman who could not make up his mind from a standing start was unlikely to clutter his profession very long. West called *Rajasthan*. " . . . Send us every hand you can possibly spare," he concluded. "I'll raise Bailey and have him rush us more crews from your service's fleet in orbit. But they can hardly arrive for a few hours yet, and we've got to make what progress we can meanwhile."

"Um-m-m . . . *nombre de Dios* . . . no, captain," Villegas said. "I am sorry, but I 'ave no authority to do t'is."

"Eh? You're in command of your own ship, aren't you?"

"Yes, but my orders were only to—"

West surprised Storrs and Golescu with a choice recital of Anglo-Saxon monosyllables. "Very well, we'll get your orders changed," he said. "Hello, hello, *Merlin* calling International—"

On the sailship, the asterites were hastily clipping tools back onto their armor. They didn't bother with any they didn't expect to need. Those could be collected afterward, if there was an afterward.

"Craziest thing I ever heard of," Storrs panted. "It *ought* to work, but—Why didn't anybody think of it on Earth?"

"Same reason you and Ed didn't, I guess," Golescu said. "It's so crude and obvious, only a low wattage brain like mine 'ud see it. At least see it quick-like. I suppose somebody would've hit on it eventually."

"That would have been too late." Storrs' gaze traveled across the awesome blue plain that wheeled before him, curtaining off half the universe. "May be too late already. Hell's kettles, what a huge job!"

"Don't remind me. I got troubles of my own. Ready? O.K., let's stop rotation."

Storrs opened the shield over the manual controls, made several adjustments, replaced the cover, and used the handle of a small crescent wrench to push a deeply recessed button. At once he leaped back, off the cylinder. Golescu went simultaneously.

They were none too soon. Gears meshed, flywheels began to spin, the motor and cargo sections took up the angular momentum which was being removed from the sail. At the same time, the disk was processed to face the sun directly.

So great a mass could not be stopped fast. Storrs and Golescu flitted clear, out into the fierce light. Their thermostatic units began to labor, converting heat into electricity and storing it in the suit capacitors. That energy would be needed; the men were going to be at work for quite a spell.

"You know," Storrs said, "you weren't right about saving everything. The sail will be lost."

"So?" Golescu returned. "The kit is what matters. A couple of hundred thousand bucks' worth of caboodle is cheap for salvaging the rest."

"If we do."

"Talk about pessimists! Sam, I'm surprised you don't wear a belt and suspenders both . . . At that, come to think of it, the pieces of sail ought to command fancy prices as souvenirs."

West contacted them: "I'm having a bit of a tussle with Bailey. Let me cut you into the circuit." A pause. "Here they are. You'll have to argue with them as well as me. Equal ranks."

"Ridiculous arrangement," Bailey said.

"Not in the least. Each of us has to be able to do any task that comes along. But let's not waste time. What precisely are your objections to our proposal?"

"Why, the whole concept is fantastic."

"Look," Storrs crackled, "this is our line of work, not yours. We know what's possible and what isn't."

"Eight hours—less than that—to handle sixteen square miles of material?" Bailey protested.

"One micron thick," West pointed out. "A hundred square yards masses only about a pound. It's not like building a frame for tugs to grapple. This job is elementary. Any spacehand with a geegee unit on his suit can do it."

"But—no, you can't."

"Not if you don't send us a swarm of men to help," West admitted. "And soon."

"If you think I'm going to authorize that kind of expense to the taxpayer, think again. I forbid this lunacy. You're hereby ordered to carry on with standard procedures."

An inarticulate sound vibrated in Storrs' throat. Golescu said bad words. West spoke with complete calm:

"You can't forbid it, or issue any order except for us to do our best. Please read the texts you've been citing to me. If Beltline is responsible for this operation, Beltline's agents have to have authority to decide how it shall be carried out. And our decision is to go for broke, as I believe you Americans say. Without your co-operation, we are bound to fail. And what excuse will you offer then? I respectfully suggest, Mr. Bailey, that you get cracking."

Stillness hummed, except for the noise of the crowding, flashing stars. Earth rolled tremendous against an ultimate dark. The sail began to bend at the edges as centrifugal force waned. Had it not faced the sun head on, it could have buckled into a hopeless tangle. As matters stood, when rotation ended it would approximate a section of a sphere.

Bailey's gulp gurgled in earplugs. "You win. I'll get several crews to you within a couple of hours, and meanwhile tell Captain Villegas to put his men under your direction. What equipment will be needed?"

"Torches, mainly," West said. "Quickest way of slicing up that stuff. We have metal rods aboard, so I can construct a frame to hold the whole mess in position myself, rather fast. Your gang will also want—"

Golescu signaled Storrs to switch bands. "*Whew!*" he said. "That was a nasty minute. I didn't think old Ed had it in him."

"Ed's a good fellow," Storrs said. "Uh, we'll still only require one man aboard *Merlin*, but—"

"Hell with that bleat. We're in this together. I'm sticking with him when the time comes."

"Right. Me, too."

It was necessary for the herdship to grapple and apply power, lest spin expose the bag to the radiation storm. Golescu should have been at the pilot board then, but he and Storrs were too exhausted. The work had been brutal. They sat in the saloon with untasted mugs of coffee, staring emptily at the bulkheads, while West rode the controls.

Outside, Lucifer ran free. Coughed from the sun, ions with energies in the millions of electron volts flooded all space. Down on Earth, tourists in the Antarctic lodges crowded into the observation domes to watch the winter sky come alive with vast flapping curtains of aurora. Elsewhere, men who had heard the news huddled near their television screens, waiting for word. Reception was poor. The nuclear generators of ships beyond the atmosphere poured power into screen fields, deflecting that murderous torrent from their hulls. The engineers' eyes never left the gauges.

Merlin throbbed. Now and then, as she moved to keep the load at the end of her grapnel on an even keel, her members groaned with stress. That was the only token granted the men in the saloon. They dared not interrupt the pilot with questions.

"It's got to work," Storrs said stupidly, for the dozenth time. He rubbed his chin. The bristles of beard made an audible scratching

"Sure it will," Golescu said. "My idea, wasn't it?" The cockiness had left his voice.

"Well," Storrs said, "If it doesn't . . . if that cargo explodes . . . we'll never know." He laid his fist on the table and regarded the knobby knuckles. "I'd like to know, though. How I'd laugh at those fat Earthlings."

Golescu reached for his coffee. It had gone cold. "They aren't that bad. And if you've got to be such a hot-bottomed patriot, don't forget that trouble on Earth would affect the Republic. We need them, same as they need us."

"Bull. I can show you economic statisics. . . . Damn and double damn! It isn't right! How many men's lives is it proper to risk, to save ten billion or so lousy dollars?"

"That dinero represents a lot more man-years than we three will rack up, even if I achieve my ambition to become a dirty old man."

"Work years. Not deaths."

"Scared?"

Storrs spat in the ashcatcher. "No. Tired and angry. This means one thing to Ed. Economic breakdown on Earth would hurt him directly. But you and me—"

"You didn't have to be aboard."

"I sure did."

"Oh, fork all those fancy moral issues," Golescu said. "This is what we get paid for."

"Hm-m-m . . . yeah . . . Another half hour to go, by the clock, if the prediction is right. I hope Ed can stand the strain."

"He'd better. That's the real chance we take. We knew right along the shield would be more than ample. Well, I saw him swallow a whole medicine chest full of anti-fatigue pills and psychodrugs." Golescu stirred in his seat. "Feel like a game of rummy?"

"No."

The sun's arrows rushed on through vacuum. Where they encountered *Merlin's* screen, they swerved, with a spiteful gout of X-radiation that her internal shielding drank up. Where they struck at the cargo section—.

They hit a barrier of plastic and aluminum: the sail, cut into fifteen-yard squares that were layered within a welded framework. The shielding factor came to about fifty grams per square centimeter. Light metals and hydrogen-rich carbon compounds are highly effective stoppers of stripped small atoms like the hydrogen and helium ions which make up nearly the whole of flare emission. For example, 32.7 grams per square centimeter of aluminum will halt protons of two hundred million electron volts. The recoil characteristics are such that secondary radiation is not a serious problem—at least, not to isonitrate, which is only touched off by a nucleus plowing into its giant molecule.

But the whole clumsy ensemble of shield, cargo section, and herdship must be kept facing directly into the blast. And gravitation kept trying to swing it into orbit, which brought gyroscopic forces into play. Control was exercised at the end of a long arm; the mass had considerable turning moment, nor was it perfectly balanced. Compensation could become over-compensation with gruesome ease.

"If we ride this one out," Golescu said, "we really will get that bonus Ed was faunching for."

"Uh-huh." Storrs raised dark-rimmed eyes. "Andy, you're a good oscar and I hope we can ship out together again, but right now I've got some thinking to do. Keep quiet, huh?"

"O.K.," Golescu said. "Though thinking's the last thing I want to do."

He prowled aft to have a look at the engine-room meters. Not that he could improve matters much if anything was going awry, in his present condition. Why had not one single man, out of the scores who divided the sail, volunteered to ride along and help? Earthlings, of course, had no great cause to love asterites. Golescu caught himself wondering if the Revolution had really been justified—if anything ever was that raised such bitterness between men. *Now stow that! Break out the guitar and—No, it'd bother Ed. Sam too, I guess.*

I should'a taken a sleeping pill . . . Uh-uh, none o' that either.

His bleared vision focused on the bank of indicators. Everything operating smoothly—good ship—wait a second! The external radiation count—

"Yi-yi-yip!" he screamed. "She's going down! The flare's dying!" And he did a war dance around the workshop and up the length of the corridor beyond.

Slowly, slowly, the storm faded. Until at last West said from the intercom, "It's over with. We're alive, boys."

Storrs began to dance, too.

After a while West reported, "Earth called in. Congratulations and so forth. They'll send a tug at once for this cargo, and hold it in the Moon's shadow while they unload. We're invited groundside for a celebration." Wistfulness tinged his voice. "D'you think the company would mind if we accepted?"

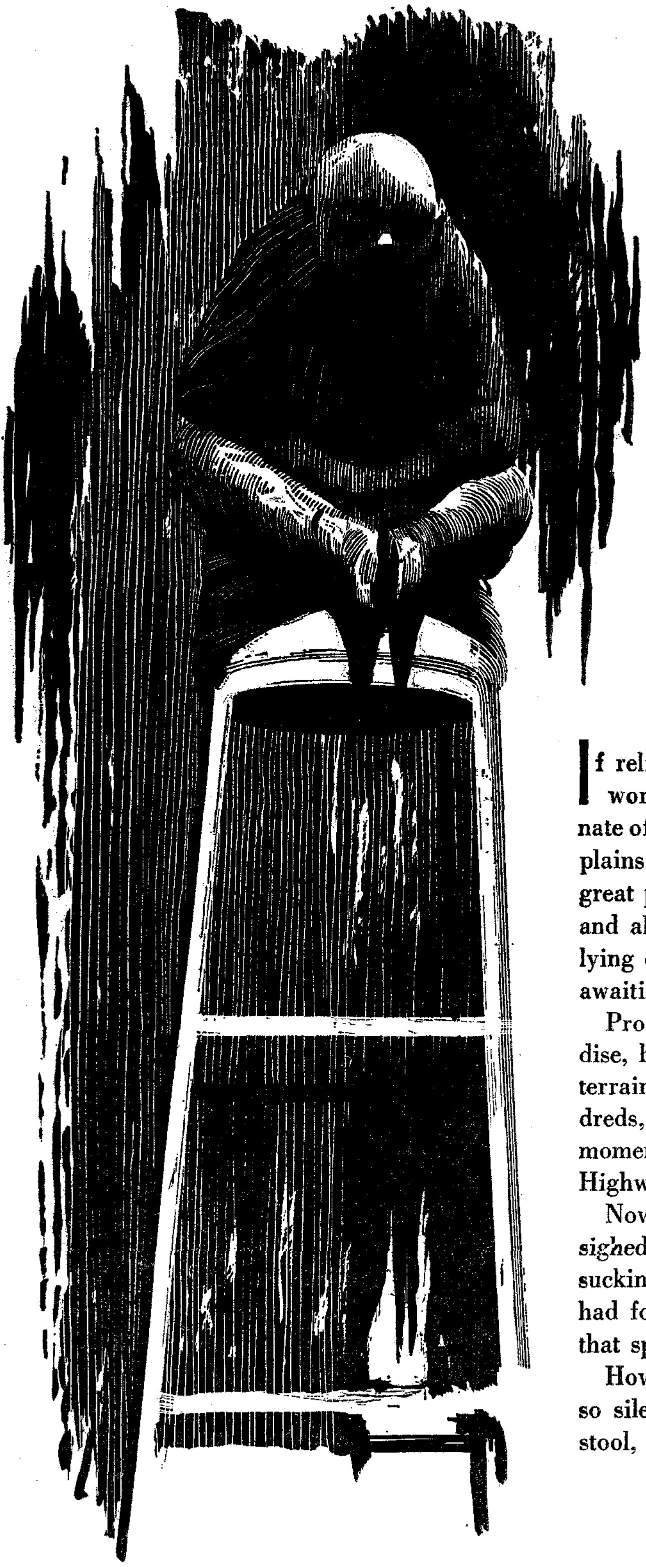
"They better not," Storrs said.

"We need a checkout anyway, after putting the ship to so much stress," Golescu added. "And they'll have to compute a new orbit for the rest of our mission. We're bound to have a few days' layover." Exhaustion dropped from him. "Fleshpots, here I come!"

He snatched up his guitar and bellowed forth:

"Ol' Einstein was a transporteer, he was, he was.
Ol' Einstein was a transporteer, he was, he was.
His racing car used too much gas;
It shrank the time but it raised the mass.
Bravo, bravo, hurrah for the transporteers!"

Now he had a story to embroider for the girls in Pallas town. ■



PROBLEM CHILD

That the child was far from normal
was quite painfully evident.
Even when the abnormality
was understood, though,
the problem of what to do about it
was still to be solved . . .

ARTHUR PORGES

Illustrated by John Schoenherr

If relief from pain can be found in absorbing mental work, then the mathematician is among the most fortunate of men. In every direction, beyond the well-cultivated plains of basic analysis, lie the unscaled peaks of the great problems, attacked, some of them for generations, and always without success. And surrounding them, or lying over the horizon, out of sight, whole new empires awaiting their inevitable conquerors.

Professor Kadar was like a man within sight of Paradise, but unable to find a path through the impassable terrain that blocked his way. He had patiently tried hundreds, all promising, only to be confronted, at the last moment, by the same yawning chasm that indicated No Highway.

Now it had checked him again. He dropped the pen, sighed, and put his head in his hands. There was a small, sucking sound, and the professor looked up. Briefly, he had forgot; that was one virtue of the thorny analysis that sprawled over a ream of yellow second sheets.

How long had the child been there? He came and went so silently these days. Perched on the tall chrome bar stool, so incongruous a seat for a three-year-old, he slumped like a Buddha across from his father. And always with that same inward look. The wizened face, still wearing that aged-in-the-womb expression of the newborn infant, seemed vaguely oriental to Kadar today. Not a Mongolian Idiot, definitely, the clinical psychologist had assured him. Just retarded.

The professor's eyes, deep-socketed and melancholy, met Paul's, which had, he felt, an unmistakable slant. He was conscious, more strongly than ever, of his son's sweetness and placidity. Odd that they should be so characteristic of the mentally retarded child. As if nature desired to compensate the cheated parents. Not that it was ever compensation enough. And in this case, when he remembered—could he really forget, even for a moment, even when that path to Paradise seemed open?—that Eleanor had died to birth this little vegetable, it was no comfort at all.

The slanting eyes, small and dark, turned inward again. Oriental or gypsy? Many Hungarians had Romany blood. Or was the doctor—all those experts he had consulted—wrong, and Paul Mongoloid?

Names, Kadar reflected bitterly. What did they mean? In mathematics, you called something a ring, a cycle, an ideal. What you named it was unimportant; all that mattered was its place in the structure—never things, but the relations among them; those were what counted. What was Paul's relation to the world, now and in the future?

For the present, he was only a baby; in many ways, less than a baby. Mrs. Merrit was a kind, motherly woman; not intelligent; not educated; but warm. Paul obviously liked her, if he responded to anybody, which was doubtful. His normal expression, in an adult, often suggested profound boredom.

The professor thought about the tests—the endless, expensive tests. Colored doo-dads, blocks, strings, geometric forms to be matched—and the brisk, young men and women who presided over the rituals. Paul had confounded all of them; Kadar felt a perverse glow of satisfaction at the thought. The boy didn't make mistakes; instead, he simply refused to co-operate. Of course, it was nothing to rejoice over. Apathy meant even more severe brain damage, the doctors seemed to think. And Paul's electroencephalographs certainly were abnormal, suggesting those of an advanced epileptic.

The child nibbled at his lips again, making that tiny murmur in his throat. The eyes turned outward briefly, met Kadar's somber gaze, then Paul slipped clumsily from the high stool and padded from the room, moving with the rather unbalanced gait of a sedentary elder.

Off for some lunch, Kadar thought. Why didn't Mrs. Merrit call the boy, instead of letting him set his own schedule? My fault, he told himself immediately. I'm letting her raise him, while I try to forget Eleanor—yes, and him, too—in my work. On the other hand, why impose disciplines on a child who never rebels? The sweet placidity of Paul was reflected in his childish routines. He ate whatever was given him—but only if hungry. He never cried; always lay quietly in bed when put there; and seldom got out until Mrs. Merrit came for him in the morning, although she mentioned occasionally, with some wonder, that he often was awake, stretched out under smooth bedclothes, with his eyes wide open.

Aside from that, his only quirk was the tall stool. At the age of two, he had already shown his preference for the flashy thing, climbing it to overlook Mrs. Merrit at her chores in kitchen and dining room.

Then, after the professor, acting on impulse, put the stool in his study, across from the big desk where he worked, Paul had come to prefer that location. Every day, for at least three hours, while Kadar scribbled away, the child sat there, sometimes apparently fascinated by the motion and hiss of the pen on paper, but more commonly with his eyes blank and unfocused.

Mrs. Merrit, naturally, thought this scandalous and unhealthy. For many weeks she tried to interest the child in a variety of toys, but without success. What the trained psychologists had been unable to accomplish, Kadar thought wryly, was not for a woman like his housekeeper to bring about between cooking and floor-mopping.

Even retarded children may be good artists. But when given crayons and big sheets of paper, Paul had made a few tentative dabs, very awkwardly, and lost interest.

The boy must at least get some exercise, Mrs. Merrit insisted, so the professor bought a jungle gym, and, to his surprise, Paul condescended to scramble about in the thing for half an hour now and then. But Kadar suspected it was that same urge to attain purely physical elevation—did the child seek a height equivalent to that of the adults around him? Was that the only break in his apathy?

Paul came back to the study, and approached the stool.

"Come here, son," the professor said, moved to try establishing a relationship that always eluded him.

Meekly, in silence, Paul padded over. Kadar looked into the slanted eyes, searching for some kind of warmth. There were undoubtedly little lights inside, but they conveyed nothing to his understanding. He put one hand on the boy's silky hair, ruffling it, and Paul stepped back—not alarmed, but somehow rejecting the act. The professor felt a sudden urge to hug him, but quelled it, he coudn't have said just why. Paul went back to the stool, scrambled up in his queerly unco-ordinated way, and sat there, lumpishly, his eyes again turned inward.

It came to Kadar, then, that Eleanor had sometimes worn such a look: an expression of deep self-communion. And yet—and yet—Uncle Janos had also looked that way often—Crazy Janos, who bungled everything he tried. Come to think of it, didn't Janos have an oriental cast of features, too? It was all so far back, and in Hungary; Kadar couldn't remember. Besides, Janos died while his nephew was still a child.

The professor reached for a fresh sheet of paper, and began again, searching for the high road to Paradise.

Fifty pages of the most advanced research—a new field of mathematics; a place beside Gauss, Abel, and Galois—hung on his finding that path. If a certain sequence converged to an irrational number, the key theorem and all that it implied was valid. And still the proof eluded him. Enough; enough; no more today; his head was on fire. Return with a fresh mind, like Poincare and the Fuchsian Functions; that was the only hope, now. But he knew it wouldn't solve anything. Only a fresh approach, something revolutionary, could smash through the iron wall.

Swaying a little, almost like Paul in his gait, Kadar left the room. He mixed a stiff Martini, drank it slowly, and felt some of the tension go out of his muscles. Mrs. Merrit hastily made him a hot snack; she was resigned to his behavior, and knew better than to try changing it.

"Tell me," he asked her, "has Paul ever tried to say anything yet? Anything at all?"

"No," she said, her eyes full of sympathy. "Just little noises in his throat. But he understands; I'm sure he understands. You know how good he is about doing what we tell him."

"I know," Kadar said darkly. "That's hardly normal, either. No mischief; no rebellion; nothing. A vegetable—sweet, insipid; like a spoiled melon."

And he thought of Eleanor—vital, alert, bubbling: beauty without slickness or affectation; warmth without sentimentality. This was the child not of Eleanor and himself, but Crazy Janos: that was a typical joke of heredity—genes and DNA and Janos ending in Paul Kadar, whose father had five paragraphs in "American Men of Science."

He left most of the lunch untouched, and went back to the study. I won't work, he told himself; but maybe just glance over the equations again. Let my mind refresh itself; no use to keep prodding it. Deep inside his brain a tiny alarm bell was ringing. What if the theorem is false? What then? Fifty pages of meaningless squiggles: a magnificent structure with no foundation.

He entered the study, and walked to the desk. The top sheet lay there, mocking him—but what was this? The last equation was crossed out, and above it there was a long line of pencil marks. Almost like mathematical symbols, but not—by God, upside down!

Bewildered, he reversed the sheet. For a moment the writing still seemed without content, then Kadar felt his heart contract like a clenched fist. A new integral transform—powerful, elegant, and startlingly original. It would crack the tough kernel of the problem as lightning shatters an oak.

He looked up, wild-eyed. Paul met his gaze squarely. The slender throat was working; the lips moved.

"Like that . . . it has to be like that. Other way . . . the pattern is ugly," the boy mumbled, his voice a queer, high-pitched stammer, as if he had to claw the words out of a diaphragm never before used.

Kadar, still uncomprehending, stared at the writing again. Upside down—because that's the way Paul, on his high perch, always saw the symbols. Their validity didn't depend on how they were written, of course.

An illiterate might conceivably, while listing words, write a simple declarative sentence. With luck, he might even hit upon a compound one, perfectly grammatical. But what were the odds against his writing immortal poetry, like: "Rough winds do shake the darling buds of May"?

Kadar looked at Paul again. The boy didn't need blocks or crayons because his mind saw every concept with perfect and immediate clarity. Just sitting on the high stool, he had absorbed a complete mathematical education from Kadar's work. Before that, he had overlooked Mrs. Merrit, but found nothing to stir his intellect. As for speaking, no doubt that, like his gait, was a matter of physique, and relatively unimportant to such a mind.

The professor felt a great surge of joy; yet, in a moment, it was tempered with sorrow. Paul was a monster, but a superior one. He was probably above—or beyond—love in the human sense. But their minds could commune, and maybe that was the best communion of all. ■

in times to come

Next month features "Undercurrents" by James H. Schmitz—which concerns the further development of the problems of a culture that has to handle the fact that psi talents do exist—without quite admitting openly that they do. As usual, when a culture has to deal with a reality it doesn't like, it tries to either control and dominate, or suppress.

In case you haven't had the experience—doing either with an active, strong-minded, intelligent teen-age girl is very, very difficult. When said young miss is also a first-rate telepath, the daughter of an accomplished politician, and a law expert in her own right . . .

Well, it was a good try!

Also coming up is Rick Raphael's sequel to "Code Three," a long novelette called "Once a Cop." Policing a five-mile-wide continent spanning ultra-highway with 400-mile-an-hour vehicles is a mechanical-technical problem of course. But there's also the old human problem of influence.

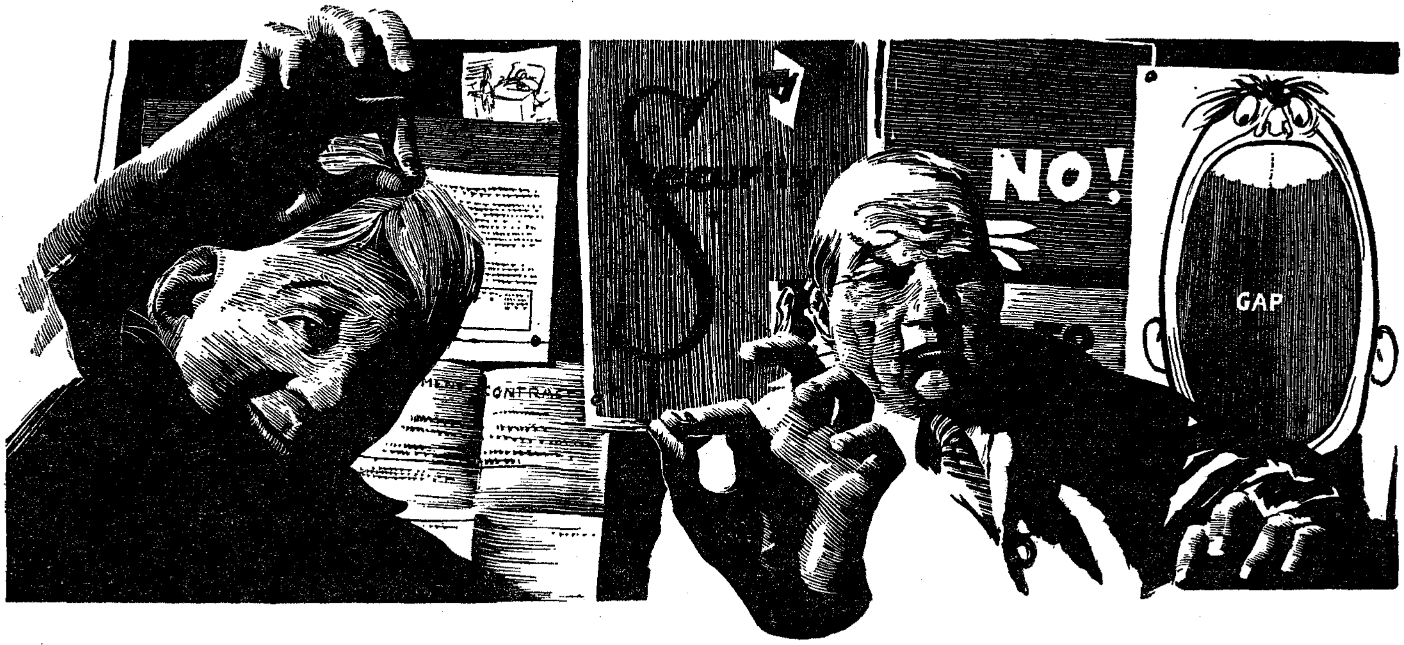
By the way . . . how would you force a speeder doing 400-plus mph to stop when he wouldn't obey the signal? Without killing him and his passengers, that is . . .

THE EDITOR

SHORTSITE

WALT and LEIGH RICHMOND

Illustrated by John Schoenherr



If you invent something that does the impossible, it necessarily behaves in a manner everyone knows it shouldn't. Therefore, when given proper tests, it won't behave as expected, and so fails the tests. Naturally!

Willy Shorts could be classified, according to who you were, in various categories.

His wife considered Willy to be a genius. His mother-in-law considered him a lazy no-good. His former employers, when they were being kind, called him eccentric.

But, if you asked Willy himself, he'd say he was a dedicated researcher. And perhaps that's what he really was.

Willy was always curious, with a curiosity that was bounded only by his pocketbook and his ability to scavenge. There never seemed to be enough thousands of dollars handy to buy that electron microscope, or some of the other toys that Willy thought he needed. Or even the dollars necessary to buy that extra battery, though you could sometimes scavenge enough materials to build reasonable facsimiles to solve most of the problems with enough time and patience. Willy's ability to have time and patience drove most people to distraction.

But if there was anything that Willy wasn't, and almost everyone would have agreed on this, it was a salesman. Willy couldn't sell beans to starving Eskimos, not even if they were properly flavored with whale blubber. And certainly, Willy couldn't sell himself. His powers in this direction reached a negative potential that would have amazed psychologists if they had noticed. Attention to himself embarrassed Willy to the degree that his brain shut off completely. So "selling" Willy was one of the tasks that his wife had undertaken for him, but with only sporadic success.

Neighbors learned ruefully about letting Willy look at their TV sets, or some of the other things that he experimented with instead of fixed. It wasn't that Willy couldn't fix a standard flatiron, Molly carefully explained to Mrs. Schultz; it was just that he had wanted to see what would happen . . . but at that point Mrs. Schultz had quit listening and stormed out clutching the smoking ruins and swearing she'd never let Willy touch anything of *hers* again.

And that time when he was working for Abe's Electronics and he experimentally hooked up a flyback transformer differently than the schematic called for. It should have made a better, brighter picture, in Willy's opinion. But in actual practice all it had done was strip the phosphor off the faceplate of the TV tube, emitting a hellish blue glare in the process and completely wrecking the tube. Abe hadn't been sympathetic about the explanation, So Willy didn't work there any more.

And so it had gone, from job to job and place to place and neighbor to neighbor. Finally, Molly got herself a job so that Willy could continue his research.

Willy read voraciously, and he had plenty of time for it now, since most of the neighbors wouldn't even talk to him, and all the employers in the city seemed to have already heard about Willy before he got there.

So Willy read and thought.

That article on superconductors. The niobium tin alloy. Fascinating. And some of the tricks that the lab boys had pulled with the stuff.

Willy had a small furnace, really little more than a hot plate and a couple of firebricks. But it could reach amazing temperatures, and surprisingly enough, Willy could make some experimental alloys in the contraption.

Willy had also discovered another trick; one discovered by other "researchers" before him, but one that worked fairly well. A letterhead and a well-typed letter to a large company will quite often produce samples by return mail for free. So Willy had samples. Closets and basement shelves full of them—exotic, little known chemicals, metals, plastics, asbestos—a wide assortment of scientific samples that had been blithely mailed to Shorts Research care of Mr. William C. Shorts, President.

The particular alloy that Willy made, one night in late June, came from samples gathered more or less randomly from his shelves to, as he put it, make some pretty fireworks for the kids. Strontium for red, copper for blue, and many others. But then, instead of making fireworks, Willy had gotten busy with the little enameling kiln, and decided to compound an alloy of his own, if anyone had asked him, "just to see what it'll do."

The alloy *did* have niobium in it, though not really very much; and that may or may not have had anything to do with the result. But when it cooled, lying there in the kiln, it took on a beautiful, golden hue, and Willy wondered for a moment whether he might have realized the old alchemist's dream of some of his distant forefathers. It looked golden. Actually, more golden than gold itself.

But when Willy tested it with a file, the file slid across the surface of the piece as though greased with ball-bearings and the piece refused to be touched at all.

The little button wasn't particularly heavy, but it had a strange property of not liking to be moved. Willy had trouble picking it up; and when he tried to put it down on the table, he seemed to have trouble putting it down as well. He picked it up and put it down for an hour, studying the effect. Then he began testing it. He tried a great many things, but it wasn't until he tested it for magnetism that he realized what he had.

Willy carefully approached the tiny golden lump with the alnico magnet he had robbed from an old radio speaker. The lump wouldn't be approached. It backed up, skittishly. He turned the magnet end for end. If it backed up from one pole it should cling to the other, he reasoned, and momentarily it seemed about to do that. It moved forward slightly, and then skittishly backed away again. Willy chased it, magnet in hand, and the golden lump scuttled away, doing its best to hide beneath a bookcase it couldn't quite get under, and then dashing madly off to the side as the magnet got too close.

"Totally repelled by both poles of a magnetic field," Willy wrote carefully in his notes. That didn't make sense, but it was a fact, and Willy put it down. And that's when he tumbled.

A superconductor? But superconductors only operate at cryogenic temperatures. Yet it answered every test for a superconductor—and now Willy knew what he had—a superconductor that would operate at normal temperatures.

Willy started selecting metals, samples from the shelf again; the same he had selected before, but this time in larger quantities. His wife didn't use the oven very much, so she might not miss the two thousand watt element out of it for some little time, Willy decided; and there were more firebricks over in the corner, the ones he had been going to build a full-sized kiln out of some day.

Carefully now, Willy went to work on his brand-new project—two thousand watt electric furnace. Molly would probably be mad if she ever noticed that the oven didn't work and found out why, but a researcher couldn't be bothered with minor details like that, so out came the oven element. Oh, and the broiler element as well. That should do it.

The resulting electric furnace would have been thought by most researchers to be very crude indeed, but it worked, and it worked quite well. The alloy that he had made in ounce size, Willy made in a five-pound lot; and five pounds of the gleaming, golden alloy cooled slowly in the furnace when Willy went to dinner that evening.

Shortsite, he was thinking. That's what we'll call it. The new normal-temperature superconductor. And it must be admitted that Willy had a few dreams of grandeur as he shared that night's plate of beans with his wife.

This time, he actually got himself through to one of the major scientific big wheels at a major research company with his sample when he went to "sell" his product.

But when he brought it out in the air-conditioned laboratory, the golden lump was just a golden lump. It didn't respond to a single test that the big wheel put it to, not even lumpishly. It not only wasn't a superconductor, it wasn't even a normal conductor. In fact, it was a pretty darned good insulator, but not good enough to be useful as an insulator..

Willy started to explain the tests he'd made and the reactions he'd gotten, but the scientist interrupted with a question.

"How did you happen to get interested in superconductors?" he asked kindly, and Willy began to stutter. His explanations were lost.

The scientist was courteous as he showed Willy out, although his feeling that he'd been "had" by an idiot underlay his courtesy quite obviously.

Willy put the little golden lump on the shelf, along with all the other samples of things he had made. And there it lay for some time.

Joe Parker, Willy's best friend, was a salesman. Not that he could keep a job as a salesman or anything else, but that he sold anything handy with the sort of automaticity with which most people breathe. Perhaps that was what made the two friends. Each did what he had to do because he had to do it, and it got them each in trouble.

Joe could sell refrigerators, or he could sell people on the idea of cashing him a check when he didn't have any money in any bank account—but he couldn't stop selling. He could sell something he just happened to pick up without noticing that it belonged to another person; or he could sell the coat off your back to somebody else, and convince you that that somebody needed it so bad you'd give Joe your coat to sell to him. Joe could sell the actual products of actual manufacturers, but he couldn't keep a job doing that, because when the regular sales day was finished he kept on selling whatever was handy, and it got him into trouble. He wasn't inherently dishonest, it was just automatic.

But mostly he was out of a job, and currently he was out of jail.

"What we want, Willy," he was explaining, "is something bright and pretty we can sort of hand-manufacture and will do something so people want to buy it.

That's when Willy remembered the little golden lump. It hadn't cost much to "manufacture"—hadn't, indeed, cost Willy anything. It was bright and pretty.

"It's a superconductor," he told Joe solemnly. "I've named it Shortsite." He reached up to get it off the shelf, but knocked it off in the process. "But," he added, "it only works some of the time."

The bright golden lump fell slowly and gracefully, drifting in a slantwise motion, and landing almost at Joe's feet.

"That's pretty," said Joe.

Recapturing it, Willy brought it up onto the table, and showed Joe what it would do in relation to a magnet. Skittishly, the lump moved back and forth, fleeing either end of the magnetic field.

Then Willy had another thought, and reached across the bench for a ring-shaped cylindrical alnico magnet with a pole on each end of the cylinder. This, he reasoned, would produce something of a cup-shaped field which might quite possibly hold the little lump steadily above it.

And so it did. Standing a full three inches above the cylindrical magnet, the gold lump rotated quietly with the inertia imparted it as Willy let go.

Joe watched, bug-eyed. "Hey," he cried, "antigravity!" And in spite of Willy's protests, this was to Joe the sum total explanation of the thing and how it operated.

"But you say it only operates sometimes?"

"Well, it wouldn't operate in that air-conditioned lab—but then I don't operate very well in air-conditioning either," Willy said. "I think the ionic changes . . ."

But Willy had lost Joe, and the other interrupted, blindly putting his finger on the exact source of trouble.

"Hell," said Joe, "it just got too cold in the air-conditioning."

Willy looked at Joe with respect. "You're probably right," he said in amazement at himself for not having seen it, and promptly went to the refrigerator where he started hammering on an ice tray frozen in and surrounded by hoarfrost.

The temperature, they found, was indeed the critical factor. As nearly as they could tell with their equipment —the refrigerator and a dime store thermometer—the Shortsite lost conductivity at 79.5°, and became instead a rather poor insulator.

"We could use it as a thermostat," Willy said doubtfully.

"The thermostat market's all tied up in scientific companies, and it's pure hell selling anything to scientific companies," said Joe. "You found that out yourself. You just leave the selling to me, Willy," he said wisely. "What we want's a gadget that'll sell in the commercial market, and this antigravity's just the ticket. Anyhow, fall's coming on, and nobody'll try to let the inside of anywhere get as cold as 79.5° until next summer. So I'll just figure out an inside use, with the furnaces on, and we'll get a market going."

Shortsite's first appearance on the market, due to Joe's genius at selling, was as an advertising gimmick.

The tiny golden balls were painted as replicas of a startled world, looking upward, and were suspended in space above a velveteen plane on which was printed the slogan "The whole world looks up to KANTS PRODUCTS."

It was a good gimmick, and the average customer was apt to stop and watch the smiling world in its "anti-gravitic" cup for minutes at a time. But it was different when two scientists from the current international conference went shopping together during an interval between meetings.

Dr. Sauernay of the Scholastica Francais and Dr. Czorenkoff of the Polytechnic Research Laboratories of Magnitogorsk, spent a short while together comparing theories as to how the device might be operated, and then each forgot the international relations game that he had been playing, and excused himself on urgent business.

When each of the two had made his way, secretly and alone, back towards the office of the manager of the store, the FBI agents trailing them became interested, too. And when each of the visiting scientists had attempted to purchase the display itself, the agents managed to thwart the attempt by brusquely requisitioning the velveteen platform, the displayed products, and the little golden ball with its cylindrical magnet.

The ball was tentatively labeled a superconductor in the FBI labs and shipped on to the NASA labs at Huntsville, Alabama for analysis.

The entire output of Shortsite to date was "bought up" from Joe by "interested store managers" who, though he managed to sell them a variety of other things, too—which they had a bit of trouble putting on their expense accounts—never suspected their identity as FBI agents.

And both Joe and Willy, much to the surprise of each, found themselves on the "Security" payrolls of the nearest government-contract corporation. It was, an official of the FBI reasoned, the easiest way to keep them under surveillance.

Of course, if any of the disguised investigators had asked Willy about Shortsite, he'd have told them all they'd have stood still to hear—its formula; its characteristics and limitations; his theories on the subject of superconductors—anything they'd have listened to. So long as they didn't ask him about himself, he might even have been lucid. But the agents were carrying out orders to keep Willy and Joe under surveillance; to see that no more Shortsite went onto the market; and to keep the whole thing a dark secret. So nobody asked Willy, and Shortsite remained a secret.

Meanwhile at Huntsville, various scientists were handed globular samples of a golden alloy, incongruously painted as replicas of the world, and asked to find its characteristics. It was believed to be, they were told, a superconductor, so, of course, they knew what to do with it.

At ordinary room temperature—air-conditioned, for it was warm in Alabama—the stuff was a pretty fair insulator. But "everybody knew" that superconductors only operated in the intense cold of cryogenic temperatures, so this didn't discourage the scientists at all. They began tests under extreme conditions of cold.

One technician even went so far as to make a graph of the temperature-versus-resistance characteristics of the material all the way from the—air-conditioned—room temperature of his laboratory down to the coldest temperature that he could produce—+0.25° Kelvin.

There were wild variations in the graph. With the first ten degrees of temperature drop from "room temperature" the resistance increased remarkably. Then it decreased remarkably. But at no point in the whole scale did the thing show even the characteristics of a good conductor, much less a superconductor.

And so the scientific team regretfully reported that this unknown material was not a superconductor, and had no apparently useful properties.

The word eventually reached the FBI in quintuplicate. The agents were called off, and Joe and Willy were now on their own in their jobs—though it had never occurred to either of them that any other condition existed.

Joe was fired almost immediately. He had very little talent in accounting. With Willy, it was a little longer before the inevitable occurred. It wasn't until Willy decided that there was a better way to do his job.

It had, for a few days, been a very interesting job. The specifications for the cables that Willy was to braid were long and involved, as only a bureaucratic specification can be. And at first, Willy had been on his metal to meet the specifications.

Of course, no one would tell Willy exactly what the cables were used for or exactly why any particular specification had to be met in just that way. "That's the way they want them," was the standard answer, an answer that Willy felt sure was coming between his nation and the solution to its current need by its trusted scientists. He had been named to be among those trusted scientists, and he must not fail the honor.

The only thing that Willy was able to deduce for sure was that the cables were being used in power circuits in satellites. Therefore, they should, in Willy's opinion, be made a great deal lighter than they were, and be insulated in a manner to prevent outgassing, which they weren't.

This was possible, Willy realized, very possible indeed—if one knew about Shortsite. A superconductor wire could be drawn infinitely finer than normal wire and still carry power; and with a very fine wire, glass would make a perfectly flexible and very good insulator which would not be subject to the outgassing problem.

Willy was familiar now with the limitations of Shortsite as to its temperature range, and so he used what he considered a "cute trick" to be sure that the power wire would maintain its conductance. A layer of nichrome, directly over the inner core of Shortsite, would heat up from the power in the circuit, and would keep the Shortsite above its 79.5° minimum, especially when insulated under glass. So his cable would have an inner core of Shortsite, a covering of nichrome, and a layer of glass.

This wasn't easy to make, in his basement laboratory.

In order to draw the Shortsite it had to be heated. In order to draw the nichrome, it had to be heated. And in order to draw the glass, of course, it had to be heated, too.

But when one put all three of these problems together, it turned out not to be too difficult after all. A bar of Shortsite, a quarter inch in diameter and three feet long, slipped into a cylinder of nichrome; and the whole thing slipped into a cylinder of high-temperature glass. Start heating at one end, and draw.

Willy did. With a week end before him, and infinite patience, he set to work. By the time he had finished he had a small spool of wire with a length of almost two hundred fifty miles.

To look at the two hundred fifty miles of wire as an individual strand required a microscope. It was almost totally invisible except under high magnification.

Willy took a piece of the wire to his foreman and tried to explain its capabilities.

"You see," he explained, "Shortsite loses its conductivity below 79.5° F. So that's why the nichrome is around it. When you plug it into a power source, the nichrome heats up and keeps the Shortsite hot, and the Shortsite conducts. That way it'll work."

The foreman had heard dreamers before, and not being blessed with 2,000-X vision couldn't see the stuff anyhow. As far as he was concerned, this particular dreamer was demonstrating empty air.

"Yes, yes," he said, "but we ain't paid to invent in this department. Now you braid those cables like it says on the specifications."

Willy was discouraged but tenacious. The government *needed* Shortsite, and the government wouldn't listen.

Carefully that night Willy braided a cable from his glass-and-nichrome covered Shortsite wire to the exact specifications of the cable with which he was working. Next morning, he installed the usual cable, but left its terminals unattached. Beside it, nearly invisible, he placed the Shortsite cable, and the terminals of this one he attached.

The unit was delivered to the test bench. Normally it would be tested before it was inspected. This time the inspection was made first.

Willy would have explained, except that the inspector advanced on him with a question.

"Just who do you think you are?" the inspector roared.

Willy was tongue-tied on that one. He was also fired.

That night Willy offered Joe the wire, as his current best in the search for "bright pretty gadgets that will do something that will make people want to buy them."

Joe, unlike the foreman, listened to the explanation of what the wire would do; and—again unlike the foreman—ascertained that Willy really DID have something in his fingers while he talked.

"And you say this stuff will carry a lot of juice? How much? As much as a house?"

Willy nodded.

"And it won't stop when it gets cold?" he asked.

"Not if you have it connected to a power source, it won't. You see, the nichrome warms up and . . ."

But Willy had lost Joe again, and Joe interrupted.

"How much of the stuff can you get me?"

"Well," said Willy ingeniously, "I only have about two hundred fifty miles of it on hand. And it takes a bit of time to draw it properly . . ."

But Joe wasn't listening any more. He had his plans laid.

Joe called it "radio transmission of power" when he talked to the buyers. It was a phrase he'd picked up from Willy years earlier, and that had intrigued him with its sales possibilities.

So when the big lighted globe appeared, apparently suspended in air, above the various stores that sold KANTS products in early January, the sign that accompanied it declared that KANTS products were as new as the radio transmission of power.

The FCC immediately sent an investigator. The investigator found the wire. The manager directed the investigator to Joe, and the wire was sent to NASA.

The FBI quietly placed both Joe and Willy back on "Security" payrolls where they could be kept under surveillance, this time, however, in a different company.

And Joe and Willy, each to his own surprise, found themselves with regular incomes again.

That the government was interested in his cable would have pleased Willy intensely if he'd known it. But the fact was top secret, and Willy didn't know it.

At Huntsville the wire arrived with the suggestion that it might be useful in satellite wiring, since it was multi-miniaturized and the insulation looked to be one that would solve the outgassing problem.

The current problem at Huntsville was low-power signal wire. So it was for low-power signal use that the wire was tested.

It didn't work, of course. Not in an air-conditioned office, anyhow. The signal power was insufficient to operate the built-in heater that Willy had included—the nichrome coating of the Shortsite didn't heat up at that low an amperage. In the air-conditioned laboratories, it was also insufficient in terms of conductivity to even carry a signal.

Regretfully, the scientists put the wire on the shelf and forgot it.

Word went back to the FBI in quintuplicate that the wire was relatively valueless.

The FBI withdrew its interest in maintaining Willy and Joe on the payrolls to which they had had them attached.

And the inevitable occurred.

Joe was fired almost immediately. His talents simply weren't fitted to any job that could be found for him around a government contract plant.

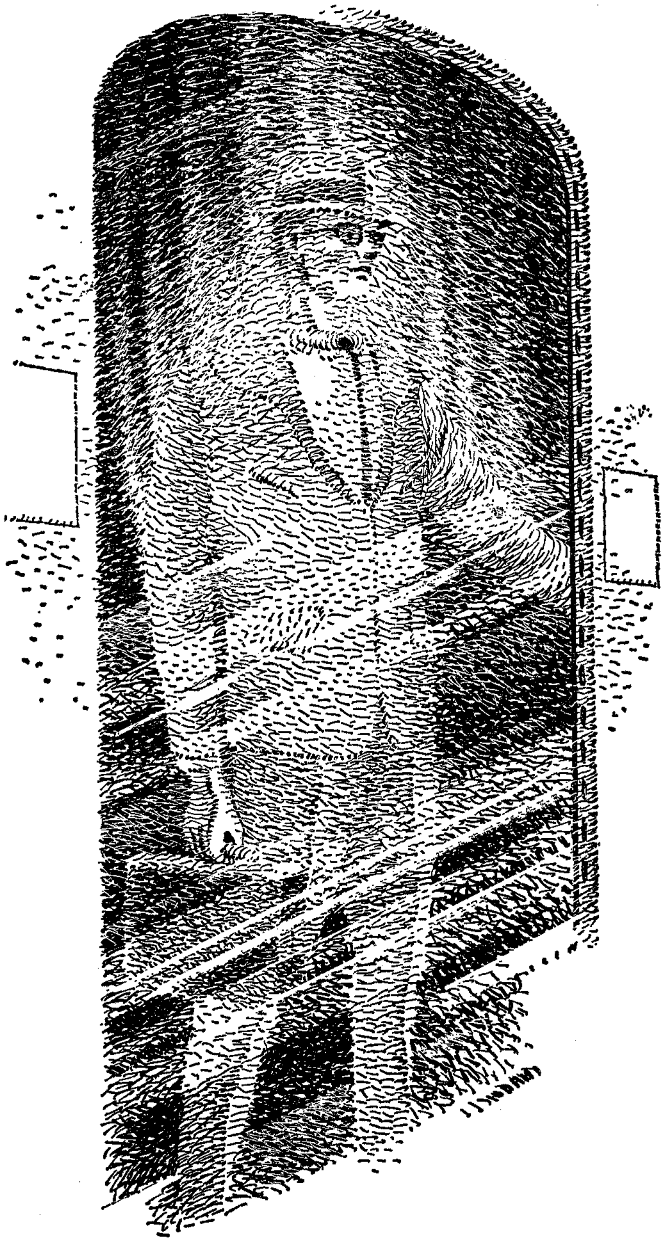
With Willy, it took a few days longer. It wasn't until Willy decided that there was a better way to do his job . . . ■

COUNTER FOIL

The trouble with teleportation
was that it was run by a computer.
and computers can count on their fingers,
have an enormous number of digits
to count on . . . and no sense whatever!
They simply can't see the obvious fact that
one and one make three.

GEORGE O. SMITH

Illustrated by George Schelling



It was near the close of a normal day in late July, if a day in late July can properly be called normal. The temperature and the humidity were tied in the mid-nineties; a reporter from the *News* fried the usual egg on the pavement while his photog snapped the picture that would adorn tomorrow's front page. There had been three flying saucer sightings reported, and the Loch Ness monster had made his appearance right on schedule. The cases of heat prostration were running at par, and nerves in the un-air-conditioned areas were fraying short. Still, the clock displayed hope as it crawled on toward the end of the work day and promised freedom from bondage and the right to pursue both internal and external liquid happiness.

Gertrude, the videophone receptionist, still looked crisp in her office. Her voice as she responded with the singy-songy, "Tele-por-*TRAN*-sit," had not lost its lilt. But it was obvious to the caller that Trudy sat in air-conditioned splendor. And either she loathed the idea of leaving her comfort and going home, or she despised he who called. For after the lilting greeting, her voice dropped to a flat, "Oh, it's you again."

Johnny Peters smiled. "Show?"

"No."

"Swim?"

"No."

"Dinner?"

"No."

"Nothing?"

"Nothing!"

"Trudy, I'm not poison, you know."

"Johnny, I know you're not poison. But you're not very ambitious, either."

"Now listen," he said sharply, "I'm only asking for a date. I'm not offering to have you share my frugal life, bed, and board as a lowly technician. A date I can afford; a wife I can't."

"You could try to get ahead."

"I've made my bid. I asked my illustrious leader for advanced training and an accelerated course so I could move along faster, and he said that moving too fast was bad for a young man. Shall I quit now and go elsewhere?"

"Where would you go?"

"That's the trouble, Trudy. I majored in teleportonics, and it's either teleportonics or I go back to school and start something new. Think the boss-man will move me faster in Greater Chicago? I doubt it. So I might as well stay right here in Megapolis."

"I suppose you're right."

"All right, let's start over again. Show?"

"Johnny, not tonight. I'm busy."

"Tomorrow?"

"If we're not all cooked by then. Call me, Johnny."

"Will do," he said with a growing smile.

Johnny Peters broke the connection and checked his instrument panel. The primary powerline from Con Edison was running a tenth of a volt low; with a bored, routine gesture he twitched a knob, watched the voltage rise, and then he settled back with little more to do until the end of his shift of duty.

In the distant reaches of the city, the uneasy slumber of a napping woman was broken by a wave of pain. A gush of body-warm wetness brought a flash of things to mind that came and went as fast as thought, far too rapidly to reproduce in any electromechanical medium of expression. She thought, in turn: It was her firstborn. The doctor said there was little point in predicting the arrival of a firstborn because they had no record upon which to base an estimate. The women in her family were prone to deliver in taxicabs and ambulances on the way to the hospital.

A second wave of pain assailed her, interrupting the rapid flow of thought. Then as the pain subsided, she went on: That was fast!

She struggled to her feet and duck-walked heavily on her heels to the videophone. She pressed the button for one of the stored-program numbers and immediately a crisp, cool voice responded, "Tele-por-*TRAN*-sit," in the lilt with all four clear tones sounding in order.

"Trudy, this is Irma Fellowes. Can you connect me with Joe?"

"Sure thing. Half a mo' and you're on. How's things?"

"Baby's on the way." The simple statement was emphasized by a smothered groan and the grimace of pain on Irma Fellowes' face.

Trudy gulped and lost her cool, crisp, composure. "Whoops! I'll give Joe the double-whammy ring."

The muted wail of a siren came, and almost instantly the scene on the videophone switched to a man, seated at his desk. His face was still changing to a look of puzzled concern. He barked, "Where's the emergency and wha . . . oh! Irma. Wh . . . er . . . ?"

"Baby's on the way, Joe."

"Fine," he said. "Have you called Maternity?"

"Not yet."

"Irma, I can't do you any good at all. I appreciate the information, but it could have waited until you got to the hospital."

"Joe! It's your child!"

"Sure. And you're my wife. Now buss off here and call the hospital. Get going."

He hung up; reluctantly because he hated the harshness of the act, but deliberately because it was the only way he could get her to move in the right direction.

Irma Fellowes stared at the videophone as though it should resume operation after a brief interruption. It didn't. Whatever she started to think at that moment was stopped by another wave of agony. When it subsided, she pressed another button, one that had been set up for a temporary emergency. It connected her with the maternity ward of City Hospital, the plate showed an elderly woman in nurse's uniform, who said, "Maternity, Nurse Wilkins speaking."

"This is Mrs. Fellowes. Baby's on the way."

"Just how frequent are your pains, Mrs. Fellowes?"

"Rapid. And the placenta—"

Irma was interrupted by another pain, through which, faintly, she heard the muted siren. Nurse Wilkins read off some detailed instructions from a card, speaking unhurriedly to someone that could not be seen on the videophone. When she finished, Nurse Wilkins said to Irma Fellowes, "Take it easy now, there's a resident doctor, an interne, and a nurse on their way."

Irma closed the circuit, waddled to the kitchen and drank a glass of water, returned to the living room and paced a bit. Perhaps two minutes passed, then came a rap on the door. She opened it to admit doctor and nurse, followed by the interne pushing a wheeled stretcher.

"Hop on," said the interne.

"I can't," groaned Irma.

The doctor scooped her up and deposited her on the stretcher. He applied stethoscope, then palpated her abdomen gently. "O.K.," he said after a moment. "Let's go. No problem."

Irma said, "But I was born in an ambulance, and—"

The doctor laughed. "Mrs. Fellowes, from what little I know of the process, teleportation flips you from entry to exit at the speed of light. Now, even if it were from here to Alpha Centauri, your baby couldn't be born en route simply because at the speed of light all timing processes come to a quiet standstill. And by 'timing processes' I mean things like clocks, and biochemical reactions, births, aging, and death. O.K.?"

"That's what Joe always says, but—"

"Well, let's find out if he's right."

The corridor was partly cooled from leakage from the air-conditioned apartments, but by contrast it was stifling enough to make Irma gasp. The interne had used foresight; the elevator door was blocked open so that no one could call it away and tie it up. He held the "No Stops" button as the elevator dropped them smoothly to the stage below the first floor. Here the full heat of the city hit them as they made their way along a short corridor to the teleportransit booth.

The signal light turned green as soon as the interne inserted the credit key in the lock-register. He pressed the buttons with a practiced hand, then paused to check the number in the address read-out carefully.

"Pays to be careful," he said.

"Ever goof?" asked the nurse.

"Not really bad," he replied turning the credit key. The green light changed to orange, which started the circuit-computer on its faster-than-lightning task of selecting the route from this entry station to the address in the read-out panel. The orange turned to red. "Um-m-m. Maternity seems to have another customer," he said. "We'll be on our way as soon as they get her out of the booth and close the door." He looked at the number again.

"Worried?" asked the nurse.

"Not really worried," he replied. "But I've been thoughtful ever since I watched a hapless, well-dressed citizen trying to walk on air back to the diving exit they have over the ocean at Jones Beach. He was still protesting and waving his brief case as he disappeared beneath the billowy wave."

"I hear you can watch about one per hour on a busy day," chuckled the doctor.

"Yeah," said the interne. He looked at the red light. "All right, all ready. Let's get cutting, huh?"

Two men whose names are legion paused and stood in momentary indecision halfway between Father's Bar and Grill on Eighth Avenue and the kiosk that led down to the 14th Street Teleportransit Station. Habit clashed with common sense; there was also the reluctance to part company.

"Fast one?"

"In this heat?"

"Father's is air-conditioned."

"So's my apartment. And there I can have the Little Woman construct me a cool, tall one whilst I get out of these clothes and into something comfortable. Then I can sit on the terrace in shorts and have my drink in comfort."

"You've got a point. No sense in leaving the office early if we don't take advantage of it."

They turned and headed for the kiosk. Down below, where the subway once rumbled, 14th Street Station was lined with booths, and before each booth was the start of a line-up of people. The big rush hour hadn't started yet, but there were enough citizens in this area who had the kind of job they could leave early to avoid the big jam. There were quite a number who didn't have that kind of job, but they left anyway, hoping their dereliction would either be overlooked or forgotten by Monday morning.

The legion of citizens who left their jobs early to avoid the rush were not being watched by Big Brother, but by an impersonal peg-count that drove a dial that indicated the number of completed transits per minute. Beside the dial was a series of animated graphs that compared the day's traffic against yesterday's traffic, the same day a year ago, the maximum and minimum for this day any year, and the grand maximum and minimum for any day any year. All of the statistical graphs showed a sudden upsurge at the line denoting five o'clock, and the animated graph-line that displayed today's traffic was approaching a record.

Today's traffic had surpassed yesterday's for the past half hour, but this was not surprising because the rush-hour and just-before-rush traffic was heavier on Friday afternoons. It would undoubtedly repeat itself on Monday morning.

But as the moving finger wrote on toward the critical hour, it approached an all-time record. This would ring no bells nor toot any whistles. It would be duly noted, and a memorandum would be issued authorizing a survey to determine the possible future expansion of facilities; the probable cost of such an expansion; and above all, how much more income would pour into the coffers of Teleportransit, Incorporated.

Walter Long said, "I appreciate your interest, Harry, but I simply can't go out of line for your Johnny Peters."

"Is it out of line?" asked Harry Warren.

"Yes, and it is also obvious to us in this section. Or, rather, it would be obvious if I did it."

"I should think you'd jump at a chance to reward someone who asked for advancement."

"I would. And I could justify jumping Peters over a number of his seniors if he were outstanding in just one department. But he isn't outstanding in anything but his ability to lolly-gag with Trudy."

"You make him sound like a washout."

"Oh, Peters is no washout," said Walter Long. "He's just not sufficiently outstanding to warrant special attention."

"Well, you must admit that maintaining a monitor over a function-panel for a system that's adjusted and operated by a computer is not a job that provides an opportunity to be outstanding. There's just so much verve and vigor with which an ambitious man can turn a small knob to twitch the incoming line voltage by a couple of tenths. This operation gets pretty dull, especially when the computer will twist the knob itself if the line gets more than about a quarter of a volt off."

"I suppose you've a point."

"I think I do. But why not ask Johnny's boss? Joe knows him better than either of us."

"All right." Walter Long pressed a button; the intercom on his desk came to life.

Trudy, her composure regained, said "Yes, Mr. Long?"

"Trudy, connect me with Joe Fellowes, will you?"

"Mr. Fellowes took off a few minutes ago."

"Where, for the Love of Pete?"

"Mrs. Fellowes called and said that her baby was on the way. Joe took off for the maternity ward right after that. I could call him."

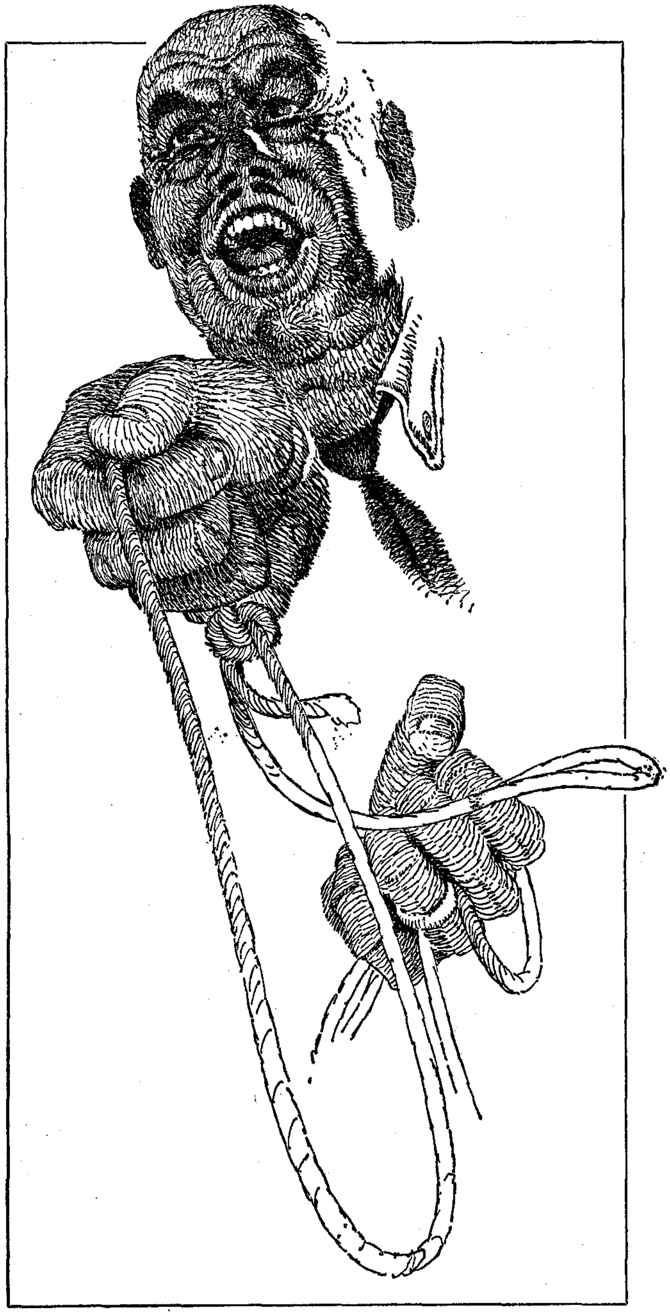
"No, don't bother right now. Just ask him to see me when he gets back. You've no word from the hospital yet, have you?"

"No, but from the way things looked, we won't have long to wait."

"O.K., Trudy. Keep me informed."

"Yes, sir." She closed the circuit; contact died in the middle of her lilting response, "Tele-por-*TRAN*-sit," to some incoming caller.

The clock hit five. The dial registering transits per minute rose sharply, and so did the graphs that displayed today's traffic compared to statistics. The increased load ran the incoming line down, the computer compensated for the drop before Johnny Peters could react. Somewhere down in the power distribution frames, a fuse blew; the local emergency power took over with no interruption while the blown fuse was replaced by a device that had neither nerves to twitch nor fingers to fumble.



The first inkling that something was wrong was given to Joe Fellowes.

Down in the computer, Joe's emergency trip from the Teleportransit Building to the maternity ward of City Hospital was racked up by the peg count circuits and added to the statistics being compiled in the Accounting Department. The computer also registered the awaiting trip of Mrs. Fellowes, the doctor, the interne, and the nurse. Being a machine, it did not understand about birth and life or death, so it can't be blamed for not registering the unborn Fellowes infant, alive and a passenger though he be.

Machinelike, it awaited the closing of the booth door that exited in the maternity ward, and when the signal came it promptly processed the party; people, stretcher, and unborn, into the system.

In the maternity ward, Joe Fellowes stared at the door to the teleportransit booth; mentally, he was urging it to open upon his wife. "What's keeping them?" he asked nervously.

"Heaven only knows," replied Nurse Wilkins, calmly.

"Something's wrong," he said.

"Hardly."

"What makes you think so?" he demanded.

"If anything were wrong, they'd call for help. Or come for it. That booth can't be used when . . . er . . . how did you get here, young man?" she demanded sharply.

"I'm with Teleportransit," he said bluntly, showing his identification card. "I used the override on your pre-empt circuit."

"Well, that's—" and she fell silent simply because it was done and neither locking the barn nor bawling out the stable boy would correct the act.

"Irma's family have their babies fast," he said. "Maybe—?"

Nurse Wilkins shook her head. "Even with delivery under way, they'd bring her back. That's why we send doctor, interne, and nurse along with everything necessary to handle any contingency. Your teleport things work so fast we can send a whole team out on a call each time."

"Fine," said Fellowes. "Then where's my wife?"

Nurse Wilkins replied sharply, "Mr. Fellowes, please grant that we know our business and how to conduct it. Granting that our hospital and its medical staff are competent, it's your teleport machinery that they're using. Maybe something broke down."

"Well, we can find out about that," he snapped back. "Teleport circuits either work or they don't. It neither swallows people nor does it go off its electromechanical rocker and run off a squadron of duplicates. So if it will run with me, it'll run with your medicos and my wife. Me? I think there's trouble at home and so I'm going to look."

Nurse Wilkins started to tell Joe Fellowes that he couldn't use the maternity ward teleportransit; but Joe, with a practiced hand, inserted his credit key with one hand and plugged in his home address with the other. He waved as he withdrew the key and he disappeared as the computer processed him into the system.

The man's disappearance brought an uneasy nervousness to Nurse Wilkins. The system must be working or, by Joe Fellowes' own statement, he couldn't have entered it. Ergo something must have gone wrong with the team of medical people dispatched to help Mrs. Fellowes. The latter did not seem likely; despite the urgency of the call and the obviously imminent parturition, it was an uncomplicated, routine matter well within the competence of the medical personnel and their equipment.

Further, the door to the booth remained dormant, its indicating lamp signaling a priority for incoming traffic. Nurse Wilkins' uneasiness increased as the minutes passed. For now was added the complication of a second level of puzzlement; granting trouble with the medical team, Joe Fellowes might well stay home with them and his wife—and baby. On the other hand, they should have warned the hospital of the emergency. And third, granting that someone goofed and returned the hospital team to a wrong address, it took but a second to correct any such error.

Nurse Wilkins stared at the door that had, despite the statement of Joe Fellowes to the contrary, swallowed one doctor, one interne, one nurse, a wagon, and one civilian whose identification card said that he was an engineer with a degree in teleportronics. And unsaid, she wondered uneasily whether the door at the other end hadn't maybe swallowed one woman in final labor and her a-borning child.

The commuting business man comprises three general types. There is he who leaves early for any number of reasons, and he who habitually stays overtime either because he is intrigued with his job or bucking for a raise, or both. The in-between is the myriad who report in slightly before opening time and leave promptly at zero five zero-zero. When the latter turns up early, he surprises his family, sometimes in activities that astonish him. When he is late, his family think in terms of dragging the river, canvassing the hospitals, and sticking hatpins into an effigy of the boss, and when he turns up the family is likely to smell his breath and inspect his handkerchief for evidence of dalliance.

Teleportransit, Incorporated did not change the habits of the commuter. At five o'clock, long queues of people lined up before the teleport booths that stood awaiting them on old subway platforms, in the basement of every large building in central Megapolis, and in special buildings to serve less densely populated areas. To serve the commuter better Teleportransit provided a commuter key with the two terminals coded in the matrix. It worked only at the commuter's home and office stations, in one and out the other exclusively. For other destinations, the address had to be spelled out digit by digit.

The upshot of this special commuter's key was rapid transit with capital letters. Step into the booth, insert the key, turn, restore, and withdraw it. How fast can a person move? With deft commuters, one teleportransit booth can handle one person every three seconds. Twelve hundred an hour. Times Square Station has three hundred booths; 34th Street has two fifty. Multiply these various values by the couple of hundred stations in Megapolis, then add the smaller numbers in the basement of the prominent buildings, and the capacity of Teleportransit to handle the four million daily commuters becomes clear.

The rush hour swung into gear and the transits per minute dial in the Teleportransit Building clicked into an upper register, reading kilotransits.

And at the terminals in Scarsdale, Mountainside, Freehold, and Sea Bright, wives collected in their station wagons to await their breadwinners. They waited. Then they looked at watches. Some turned on radios to check the time. Quite a few worried, and an equal number changed their expression from bored tolerance to knowing accusation of infidelity. Only one thing was glaringly obvious. Either the teleport system had broken down, or all husbands were delinquent at the same time, if not at the same place.

Giving the poor devils the benefit of the doubt the thing to do was to ask someone what went on. And so—

"Tele-por-*TRAN*-sit," sang Trudy, waiting for her date.

"Hello," came a female voice, "is something wrong?"

"Wrong?" asked Trudy.

"Yes. My husband hasn't come home yet."

"Well, I haven't— No, I mean, why ask me?"

"This is the Teleportransit Office, isn't it?"

"Yes, but—"

"Well, miss, it isn't only my husband. None of them have come home."

"I don't understand."

"Neither do I. Every night there're about forty of us waiting here, and our men come home one at a time over about fifteen minutes. Now we're here a half hour and not a one has come out of your station."

"Wait a moment. I'll check." Trudy buzzed Walter Long and told him, "There's a woman on the videophone who thinks the system has broken down."

"It couldn't," said Walter Long, stoutly. "Put her on, Trudy."

The harassed voice, having run through the story once for Trudy, had it better prepared for Walter Long. When she finished, he assured her, "Madam, we apologize for this inconvenience, and I personally thank you for bringing it to my attention. It's the first I knew of any tie-up. Now, let me attend to it at once, and we'll have your husband home in a jiffy. And thank you for calling."

"But where is he?" the woman wailed.

"Don't worry, madam," he said calmly. "If he hasn't come out of the exit, he hasn't gone into the entrance. So there are probably a lot of irate husbands standing angrily in front of an inoperative teleport booth."

"But they all come from different places," she wailed.

"We'll get them home," repeated Walter Long. He broke the circuit because talking to this anxious woman was not letting him get to the source of the problem. He buzzed Trudy and heard her sing, "Tele-por-*Tran*-sit," with some of the zing gone from her lilt. "Oh! Mr. Long. White Plains and Far Hills have both reported some sort of trouble."

"Trudy, call the hospital and find out where Joe Fellowes is, and how fast can he get back here."

"Yes, sir." Long waited on the circuit while Trudy got Nurse Wilkins, who explained that neither doctor, interne, nurse, stretcher-wagon, nor Mr. Fellowes had returned, and that they'd been gone for almost half an hour. When that was finished, Walter Long said, "Trudy, call Joe's home." Once more he waited on the circuit, but this time it was completely unfinished because the videophone ring-back burrred and burrrred without an answer.

"Something's gone a long way wrong, Trudy," he said solemnly. On the open circuit, Walter Long could hear the incoming calls beginning to pile up. Trudy's usual singsong diminished until it became a flat and uninspired, "Teleportransit," followed by a wait and the terse explanation that a minor breakdown had occurred, that they were working on it; and no, she was merely the receptionist and didn't know a three-port circulator from a dithrymbic foot. Sorry, but the technical staff is all busy correcting the fault and can't be interrupted.

"Trudy!" barked Walter Long.

"Yes?"

"Put the lilt back in your voice, and then record that last explanation and switch your board to automatic response. Just keep the private company incoming lines open."

"Yes, sir."

"And then come in here."

"Yes, sir. As soon as I finish."

When she entered, Walter Long said, "Trudy, among the things that are wrong is the absence of Joe Fellowes. That nurse said he went home, but hasn't returned. Maybe something's wrong at the Fellowes end of that circuit—by which I mean his wife and baby. Will you take a minute to run over to Fellowes' station and check?"

"Surely."

"And come back immediately. Understand? At once. Don't wait even if they have something vital that depends on you. Come back here and report. Understand?"

"Yes, Mr. Long. That's a promise."

Trudy used the teleport booth in the main front office. She was ultra-careful, inserting her credit key and entering each digit in the Fellowes address with deliberation. She checked the read-out digit by digit before she was satisfied enough to re-turn the key in the lock-register to start the teleport process.

Like the four million commuters who disappeared once each morning and once each night, Trudy ceased to exist in the teleport booth that stood in the main front office of Teleportransit, Incorporated.

Like Nurse Wilkins and four million waiting wives, mistresses, girl friends, and terminal-station bartenders, Walter Long stared at the closed booth door and prayed for it to open. His staring became a vigil, for minutes stretched out and the girl did not return.

"Blast that girl," muttered Walter Long, "and she promised."

It was ten minutes of six when Walter Long called Harry Warren. "Harry, something's wrong."

"Wrong? Can it wait until morning, Walter. We've company coming tonight, and—"

"Tomorrow's Saturday, Harry."

"Yes. I know. So I'll come in tomorrow and settle it. Leave me a note about it. I'm off to home."

"Wait, Harry. Don't go. Don't, of all things, use the teleport."

"Now that's downright silly. How else can I get home?"

"Harry, to the best of my knowledge, people seem to be going into the system, but none are coming out."

"What?"

"You heard me right."

"Where's Fellowes?"

"That's the trouble. Fellowes was one of the first."

"But what are we going to do?"

"Has the technical staff—?"

"Yeah. At five o'clock they headed for the teleport on a dead run."

"Right into this Frankenstein's Monster we own."

"Moloch was the god that ate 'em alive," said Harry Warren absently. "Well, there's still maintenance and monitor. The night man."

"And if I guess right, he's probably the closest guy this side of Pittsburgh, Boston, or Washington who knows anything about the technical side of teleportation. Get him up here."

"Maybe we'd better go down to him."

"That'll leave the office empty if someone calls."

"Ask Trudy to stay over a bit. After all, this is an emergency."

"I can't. I sent Trudy through the teleport to look for Joe Fellowes. She's gone, too."

"There are days when everything goes wrong," said Harry Warren. "Now I find that monitor and maintenance is none other than Johnny Peters."

"How come? If he has the duty tonight, why was he asking Trudy for a date."

"It seems that she three-quarters promised him a date for tomorrow night, so Peters swapped nights with Frank Nash."

"Well, if I can plug up the company lines on the switchboard without electrocuting myself, I'll set them up on the downstairs set."

Johnny Peters lounged at the big test and control console, his feet hooked on one edge of the desk-panel. He was reading a magazine, and from time to time he let his eyes stray over the meters. He was bored, and he was frustrated because being the back-up to a completely self-adjusting, self-repairing, automatic machine does not leave much opportunity to perform noteworthy deeds. He was in this attitude when Harry Warren and Walter Long burst in upon him.

"Hell breaking loose all over Megapolis" yelled Harry Warren, "and you sit there as if nothing were going on."

"So what's going on? No one tells me anything," replied Johnny Peters.

"You don't know?" asked Walter Long incredulously.

"No, I don't."

Harry Warren looked at the control console full of meters, dials, and multicolored pilot and warning lamps. "Is that thing functioning properly?"

Peters cast a rapid eye over the board. "Perfectly," he said, reaching out and giving one small knob an imperceptible turn.

"How can you be so sure so fast?"

"There isn't a red lamp showing," he said with a sweeping wave of his hand. "Blue-green indicates operating circuits that are functioning properly; yellow-orange indicates feed-back information—a continuous incoming flow of variables—that keep the operating circuits so properly adusted that they maintain a continuous show of blue-green. Hasn't been a red lamp shown since I've been with Teleportransit, but I'm told that whistles blow, bells ring, cannon are fired and—"

"Well, something's gone to hell in a handbasket."

"For instance, what?"

"Our teleport system isn't working."

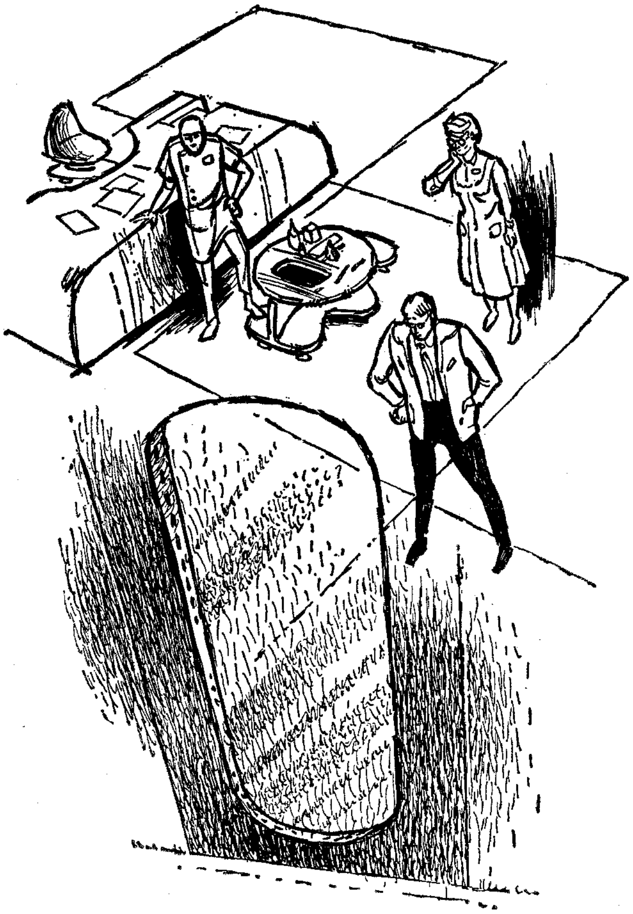
"Nonsense!" Peters pointed to a large dial. "Load's low tonight, but we're still making a couple of—"

"Stop them!" yelled Walter Long. "Peters, since somewhere about a quarter to five this evening, people have been a-pouring into the entrances, and not coming out of the exits."

"But that can't happen."

"You explain that to four million commuters—if we ever get 'em back."

"And if we don't, you try to explain it to their heirs and assigns," said Harry Warren.



"Is this condition local or widespread?" asked Peters.

"It's the entire system."

"No," said Peters, "I mean, has Pittsburgh or Greater Chicago reported the same mess-up?"

"That we don't know."

"Then let's find out," said Peters. On the console, he snapped a switch. A videoplate came to life, there was a brief ringback burrr, and then a man's face appeared.

"Peters here, Megapolis. Teleportransit, Inc."

"Hi. James Gale. Pittsburgh Rapid. What's on your mind?"

"Have you any trouble reports?"

"No. What kind of trouble?"

"No tie-ups?"

"No. Now what can happen to a teleport circuit to tie it up?"

"I don't know, but everybody who goes into our machine just simply stays there."

"But that's not possible."

"All right. So that makes it a manifestation of the supernatural and it's swallowed more'n four million commuters, and it's continuing to swallow them at the rate of about fifteen hundred per minute."

"Turn it off," advised Jim Gale.

"I don't dare," said Johnny Peters. "I have the uneasy feeling that continued operation is the only contact that lies between here and the limbo they're lost in. I've no sound, scientific logic for that queasy feeling; it's just a conviction that I must follow." He turned to look at Walter Long and Harry Warren. Both of them looked blank until Johnny Peters said, "Unless I'm ordered to," at which they both shook their heads violently.

"Well, this I've got to see," said Gale. "I'm coming over."

"Woah!" cried Peters. "I'd advise some other mode of transportation."

"Um . . . guess you're right. So is there anything I can do to help?"

"Yes," said Walter Long quickly. "Get in touch with your top-level technical staff and tell them what we're up against. You can also call Boston and Washington and ask them what to do. See if the best technical brains of all three cities can get train or car to come here as fast as possible. In the meantime, we'll have to muddle through with a junior technician, a business administrator, and one puzzled personnel relations counsel."

Throughout Megapolis, the news was spreading fast. In an earlier day, the radio in the automobile or in the depot bar would have spread the news like wildfire. But the habit of the commuter was to get where he was going first, and then relax to get the news. The news was thus delayed in its dissemination by the recipient's habits, not by any machination of press, government, big business, or unfavorable foreign powers.

The transits-per-minute meter began to taper off in an increasing drop as the news was spread. But it did not drop to zero because there were those that had not heard, those who did not believe, a number whose curiosity exceeded their good sense, a few misguided self-sacrificers, and a low but continuous counting rate pegged up by sheer habit. For just as people during a power failure will enter a room and flip the light switch in a reflex action, people preoccupied with other things turned into the teleport booth out of habit and whisked themselves into limbo.

More time passed; it takes time for the central nervous system of a vast Megapolis to react to a widespread emergency. Had one called two and the two then called four, and the four called eight, the word would have spread fast. But plans and programs such as this fail unsafely at the first breach in the pattern for there is no way of bridging the missing link. So in the usual ponderous way, the commissioners called the captains and the captains notified their lieutenants, and soon the word was spread to the patrolmen. And where there was a missing link to bridge, the radio called the patrolmen, firemen off-duty, members of the civil defense, and anybody who could be sworn to duty.

And not a few of these succumbed to habit by trying to take the teleport system to the teleport station they'd been assigned to prevent people from using.

Ultimately, the stations were under control and the transits-per-minute meter was down to an unreadable, but still-not-zero figure. By this time, the hidden, unknown plane beyond the entrance of the teleports had its share of policemen and other keepers of the civic peace.

Johnny Peters looked at the mass of gray hammertone finish, chromium, and glass, and he realized a helplessness, a complete futility, the utter impossibility of doing anything useful. For what had always worked properly had stopped abruptly at about four thirty in the afternoon. It was as if the sun, having come up on time since the dawn of eyes to watch for it, failed to show.

For Teleportransit was to Megapolis as hundreds of other teleport companies were to their respective cities. Take twelve years of handling commuter traffic five days each week and multiply that by the number of cities that had solved the commuting problem by licensing teleport companies, then quote the figure as a statistic with zero accidents in transit. The odds begin to approach the probabilities that the sun will not be late tomorrow morning.

Still, to Johnny Peters, Walter Long, and Harry Warren, there was no realization of the enormity of the situation. It was too impersonal, too remote, too vast. That four or five million human souls had vanished into their machinery was a fact they could not comprehend.

But as the word spread throughout the city, millions of individuals became intimately aware of a shocking, abrupt personal loss. And for the number who fold their hands and say "Kismet," there are an equal number who want to strike back. And so part of the public became a mob.

The nightwatchman on duty at the main door of the Teleportransit Building saw the mob approach but did not comprehend until the leaders crashed the big plate glass doors with a timber. As the mob came boiling into the lobby of the building, the nightwatchman fled in terror, taking the obvious way out along with two of the mob who pursued him into the teleport booth.

Had there been no stairs, the elevator system might have cooled some of the anger, for a mob completely articulated into tiny groups out of communication with one another loses the ability to regenerate their mass anger. The leaders, without a shouting mass behind them, might have listened to reason. But the elevators, at night, would respond only to authorized employees with special keys. And so the mob, strung into a broad-fronted wave, trailed up the stairs after the leaders. The toil of climbing added to their anger.

To prove the paranoiac quality of the mob, the air-conditioning in the Teleportransit Building did not give them any comfort; it made them resent even more the men they held responsible because they sat in comfort to perpetrate the outrage.

Within the equipment room, the status remained quo. But not for long.

The heavy doors muffled the sound of the mob; by the time the noise penetrated loud enough to attract the three men in the room, the same timber used to crash the main doors came hurtling through the doors to the equipment room.

The foremost of the mob milled into the room and grabbed the three men. There were shouts of lynch-law: "Give it to 'em!" and "String 'em up!" and someone with a length of clothesline weasled his way through the mob to the fore.

A slipknot is not as efficient as the hangman's noose with its thirteen turns, but it is effective. It is also terrifying. Being in the hands of a mob is panic-making in its own right. The sight of rope adds terror. Such shock makes some people faint, some are simply stunned into inaction, and some enter a strange mental stage through which they watch the proceedings without realizing that the mob is going to harm them.

Some men take on a madman's fury, break free, and try to run.

As three of the mob held Johnny Peters, a fourth started to put the slip-knot over his head, while a fifth tossed the other end of the clothesline over a ceiling strut. Johnny Peters lashed out, broke the grip of the three who held him, smashed the noose-holder in the face, and took off through the room, scattering the mob by sheer force. Behind him trailed the clothesline, for his wild, roundhouse swing had passed through the noose.

Wildly, Johnny Peters headed for the only haven he knew, and as the door to the teleport booth closed behind him, the man who held the end of the rope shook it with a mad roaring laugh:

"He ain't going nowhere!"

With deliberation, he started to collect the line, hand over hand. It slung in a tightening catenary from the ceiling strut over to the teleport booth door frame.

Unmindful of his tether, Johnny Peters fished his key out, plugged it in, and twisted.

With a roar, three of the mob grabbed the rope and hauled. The end, cut clean, pulled out of the door frame gasket and trailed across the floor; the three who had hauled went a-sprawl. For, as a moment of thought must reveal, the system could hardly teleport a material body instantaneously into an enclosed exit booth without creating an explosion of thermonuclear proportions. The teleport booths were carefully made to rigid dimensions; in the transit, everything contained in one went to the other; they swapped.

Johnny Peters disappeared trailing his length of line.

Johnny Peters was in a nearly indescribable state of—awareness. There was no sense of feeling; the tactile sense no longer existed. The sensitive tip of the tongue did not send continuous messages to the brain about the state of teeth or the amount of saliva. The telemetry that provides feedback of limb position was missing. Pressure against the feet was gone, as if there were no gravity.

Where he was, there was no sound. Or, if sound existed there, he had not the ears with which to hear—nor taste, nor sight, nor olfactory sense.

Yet he felt an awareness of self, of being, of existing.

A remnant of long-forgotten Latin occurred, "*Cogit, ergo sum.*" and he wondered whether his Latin was correct. But right or wrong in the classics, Johnny Peters thought, and therefore he existed.

And once this became evident to Johnny Peters, there came the usual return of hope, for so long as life existed, there was hope of getting back from whatever strange plane he had entered. Then, with panic subsiding, Johnny Peters became faintly aware of others.

This, too, was a strange awareness. In life; for example, on a street car or subway, a person is aware of the presence of others because every sensory channel is bombarded, assaulted, overloaded. One can say, "They were so thick I could taste it!" and not be far from wrong because the chemicals that carry the spoor of close-packed humanity to the sense of smell are soluble in water, in saliva the smell becomes a taste.

This was, or was it, like telepathy?

What is telepathy like? Does the telepath dial a mental address and then carry on a two-way remark-and-rejoinder, or does he broadcast on an open band? Can he extract the mental peregrinations of someone who is unaware of this invasion of privacy, or does the human desire for privacy act as a barrier? Is that why telepathy is not a going process?

In any event, Johnny Peters was aware of the presence of others; perhaps it is better to say that he was aware of the awareness of others. Then as this awareness became stronger and less puzzling, he became vaguely and faintly cognizant of identity. Not identity in the sense that an individual is identified, but rather in the sense that his awareness included a number of separate entities. He recognized none of them, which may not be surprising since he had, by now, about five million individuals for company.

Johnny Peters knew how the teleport worked, but still had difficulty in freeing his mind of the feeling that others who had used the teleport booth in the equipment room of the Teleportransit Building should be somewhere just beyond the entrance portal. Where they were he could not imagine, but he knew that the medium was not like a plugged tunnel, even though the tunnel albeit virtual, was the foundation for the teleport.

For when the junction of a diode is very thin, and the energy of the electrons is very low, Heisenberg's Uncertainty says that they have a definite probability of crossing the forbidden gap in the junction and appearing on the other side. In the tunnel diode, simple probability is loaded with a voltage bias so that a current flows across the forbidden gap; electrons pass through invisibly as if they flowed through a tunnel. The teleport performed the same operation with humans and things—or had until five million people occupied the forbidden gap between terminals.

And so the people, instead of compact, locatable entities, were diffused essences of their beings, their awarenesses, occupying a volume of probability that encompassed and more likely exceeded the most distant of Teleportransit's wide-flung network of terminals.

Aware that he was mingled with other entities, Johnny Peters felt the need of finding and identifying someone, anyone he knew as an individual; an awareness that was not simply another being, but a definite being. Simple want called her name to mind, and somehow he formed the silent concept:

"Trudy!"

It gave directivity to his being, and cleared things; now he became aware of others, trying to make contact in the same way. Some of them had. Two were commenting on the situation in exceedingly uncomplimentary terms, in fact, they made his mind blush. Another was radiating the concept that he didn't know where he was but at least he wasn't suffering from the heat.

Johnny Peters tried again. "Trudy!"

If a completely diffused being had feelings, he might have felt something. Instead, he merely became aware of being surrounded by more essences of awareness, a mental crowding. This corresponded to his concept of the volume of probability; given absolutely zero energy, the probability was equally good to be anywhere in the Universe. But as the energy became significant, the volume of probability shrunk. Furthermore, there was a higher probability of occupying the center or near-center of the volume than occupying the outer edges. The distribution, of course, was Gaussian.

Then he became aware of a reply. The concept, "Johnny?"

"Yes, Trudy."

"What happened? Where are we?"

"Where we are I don't know," he formed. "It's supposed to be a forbidden gap between terminals that nothing can occupy. That's why nothing ever got lost before. It's either here or there, but never between."

"I don't see," came the faltering reply. "But what happened?"

"I don't know, but I think it's some sort of traffic jam on the teleport."

"But why?"

"Lord knows. Let's figure it out after we find out how to get out of this in-between mess."

"Do you think you can?"

"I'm not too sure, but Joe Fellowes must be in this mess somewhere."

"Let's both call him."

Together, they formed the concept, "Joe Fellowes!"

Again there was the awareness of something shifting, of a mental crowding; a reshuffling of the entities.

Trudy radiated, "Johnny?"

"Yes?"

"Johnny—I get the distinct impression of a baby crying."

"Uh—yeah."

The awareness of reshuffling became intense. At one point, Johnny Peters caught a thought that might have been a reply from Joe Fellowes.

"Trudy?"

"Yes, Johnny?"

"Let's try Joe Fellowes again."

"No, let's try Irma Fellowes. I think women are more sensitive."

"Only a woman would make that statement," was his response, "but I'll try anything."

Now the reshuffling was almost a physical motion; the awareness of movement through a densely-packed medium, of motion blocked from time to time, of packing tight, of flowing ever-so-slowly through extreme difficulty toward some focal point.

"Irma Fellowes?"

Faintly, dimly came the reply, unformed and wordless, but nonetheless it was the awareness of Irma Fellowes. Motion became a struggle, but they fought to move, urged on by some unknown drive.

Now the awareness of Irma Fellowes was stronger, mental flashes of Joe Fellowes began to come in, and as the latter increased in clarity, others began. There was the doctor; his awareness was concern for his patient. The interne was merely anxious to get back to his post. The nurse was impatient because she had a date that evening and didn't want to miss it. The baby was complaining, as babies do, about the rough treatment that was meted upon one's first appearance on Earth.

"Is it a boy or girl?" wondered Irma Fellowes.

"How can we possibly find out in this . . . this . . . nothingness?"

The interne advised, "Find out whether baby's thinking blue or pink thoughts."

Nurse wanted to know, "Is it born?"

Joe Fellowes' thought was a snort. "How can anything be born of a diffused essence that's spread out over a spherical volume of probability about a hundred and fifty miles in diameter? The term's meaningless."

"But what are we breathing? And how will we eat?"

The question, unanswerable by any form of reasoning or logic, was interrupted by a stronger cry from the baby, a feeling of strain having been eased. The packed-in awareness flowed away and throughout the entire volume of probability, motion became fluid, fast, and free.

The exit terminals of Teleportransit began to spew forth humanity. They landed running, some of them; others were pushed violently because they did not move forward out of the way fast enough. The big rush hour of Megapolis, started two hours ago, was finishing. With the finish on one hundred and twenty minutes of overtime, the mysterious medium between the terminals, was doing its best to live up to the definition, "forbidden gap."

Being people once more instead of merely aware essences, they raised their voices.

"It's a boy," said the doctor.

"But what happened?" asked Trudy.

"It was like a log jam," explained Joe Fellowes. "And baby was the key log."

"But how could the teleport system form such a jam?" demanded Johnny Peters.

"We were too efficient," said Fellowes. "Our coincidence counting circuits are set up to make a double check on the transits. Some shiny-bottomed accountant wanted to be more than certain that every transit was paid for, so all trips are checked at the entrance and again at the exit. Baby made 'em mismatch."

"All right, so how did we break the jam?"

"You did," chuckled Fellowes. "You went in to the teleport booth and plugged in your key without entering a destination. That made the number of in-counts match the number of out-counts. And once your awareness approached the troubled area, the uncertainty of which was which, or in this case, whose was whose, became high enough in probability to effect a transfer. Boom! The log jam breaks and everything comes tumbling home."

"But—?"

"Baby? Well, you've heard it said that when they start, nothing will stop 'em," chuckled Fellowes. "And so baby has the dubious honor of being the first kid born en route to the hospital by teleport."

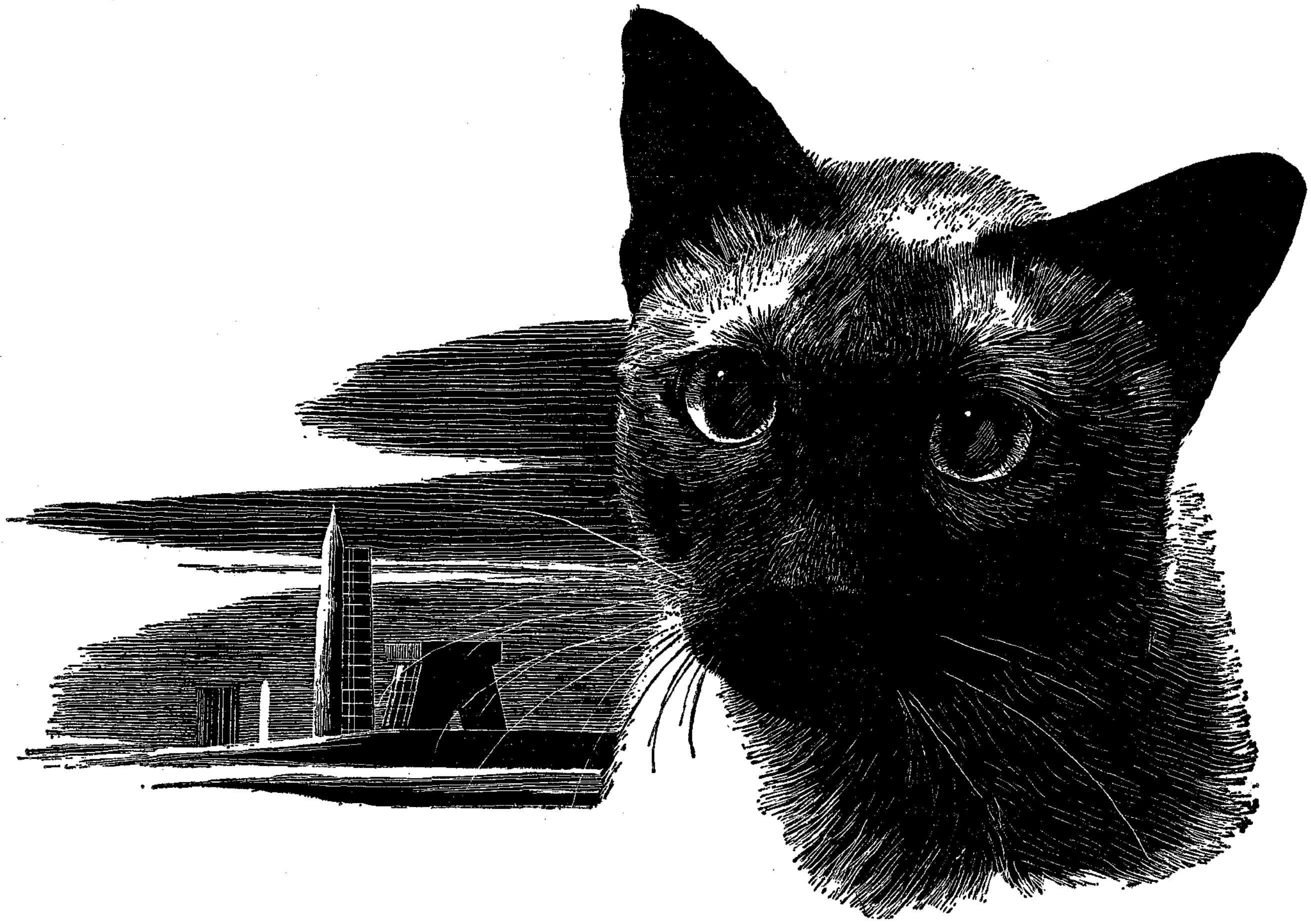
"And," said the doctor dryly, "delivered by a diffused medical team of essences." ■

THE SPY

. . . And even if Tequila, who couldn't talk, had been able to answer that question, he'd have given a wrong answer!

MARIO BRAND

Illustrated by John Schoenherr



Tequila did not even stop to ponder his surroundings, or how he had gotten where he was. His four paws instinctively padded his eager body helter-skelter to the little doorway from which the overpowering waves of enticing catnip-smell emanated. He butted his sleek head through the diaphragm over the opening and when his head emerged on the other side, he found himself staring uncomprehendingly at a bright moving circle of light. Before he could look away, the light became feline heaven.

He embarked on a night of adventure in which he exchanged amorous experiences with friendly tabbies, gorged himself on luscious piles of fresh red meat, lapped at convenient bowls of rich warm milk and buried himself ecstatically in bewitching hills of fresh, moist catnip.

Nard, socio-psychological analyst, Grade II, watched from behind a viewscreen as Tequila emerged from the culvert-size integrator and crossed the small open space of the chamber leading to the catnip-baited door. The tomcat's head hardly entered the hypno-chamber before he had expertly injected the now-immobilized animal with a modified form of Insulin. Satisfied, he stepped back to make room for Casan who was soon busily adjusting many complicated image-probes, blood analyzers and cerebral stimulators to the head and body of the entranced Tequila.

"You know," Nard observed, as Casan was placing the final probes in position, "I've often wondered if the molecular dissolution of a body on another planet and its trip here for reintegration alters any of its memory-images? After all, Earth is a million and a half light-years away. Quite a little distance!"

"I wouldn't worry about it," grunted Casan, crossly. He wrinkled his nose in disapproval at the penetrating odor of perfume which arose apparently from behind the cat's ears.

"Earthlings!" he exclaimed. "I suppose the female playfully daubed some of her odor-cover on their pet. We'll see in a few moments anyway, as soon as the Insulin has reduced the glucose level sufficiently."

"Oh, yes, to get back to what you said a few minutes ago—I don't think the Seidler Beam alters any memory-images at all. We've been using it for many centuries already and our information on Earth's technological progress keeps rolling in steadily. Just remember"—he gestured for emphasis—"during that period of time we've been using generations of Earth cats as observors. They've lived right with the Earthlings ever since there has been any social structure there worthy of the name. Anyway, by correlating all the information from many observors we've been able to rule-out any errors that may have been made by any one observor because the individual error, or, for that matter, any memory-image which may have been changed in the Beam's time-ways, would show up as an inconsistency when we correlate our final facts to show the whole event in question."

At this moment, a warning buzzer sounded to indicate that the glucose level in the cat's blood was lowered as far as the measured dose of Insulin was designed to take it. Casan energized the cerebral probes and adjusted the recorder. On a small monitor screen in the main unit's master panel there emerged a scene on Earth, as it had been seen through the cat's eyes. The scene occurred five days ago.

"He must be on a chair," Nard pointed out, referring to Tequila's position at the time.

"There! The floor just bounced up to cover the screen, which indicates that he's jumped down from the chair. There's a table leg approaching—he must be going to rub against it."

Casan yawned. "Tell you what; I'm tired! I've read the reports on this observor before and all we're really interested in is a room called a 'Study' in this house. The cat's owner is an engineer and his notes are on their rudimentary research into quite simple problems of heat-exchange. If the observor happens to wander into the Study, call my room and hold a visiphone on the monitor screen. I'd like to see what further notes the engineer has made; if any."

Nard agreed and returned to watching the many dials and gauges that mirrored the mental and physical condition of the hypnotized cat. It was a monotonous vigil but he knew he was not alone. In thousands of rooms just like this one, all over the third planet of Almach, thousands of other analysts, like himself, were performing the same duties—observing, recording and monitoring thousands of Earth cats who had innocently and full of curiosity crawled into culverts and other small openings on Earth. Only the openings led into disintegrators, connected directly to Seidler Beam projectors which transported the cats instantaneously to the integrators on this planet.

Cats had been chosen by Nard's ancestors as admirable observors of the progress of Earth's science. The animals were extremely independent and thus they saw things and events objectively, devoid of the emotional overtones that usually distort observed reality. It was realized that cats were also the most curious of Earth animals and thus they prowled and investigated every nook and cranny of their planet. They chased mice out of university buildings housing cyclotrons as well as out of warehouses storing equipment for man's thus far feeble attempts to overcome his planet's imprisoning gravity.

Cats had been the close companions of Earth's leading scientists and mathematicians and had solemnly listened to lectures and explanations of problems which could better be worked-out by verbalizing—especially to an intelligent audience such as the silent, attentive, and appreciative house pet.

The original choice of cats had been one of necessity as the primitive Seidler Beams could not handle too large a burden over such a distance. But, by the time the beaming apparatus was refined sufficiently to where larger objects could be transported, the cats had become indispensable and trusted observors. It was generally agreed that they would remain in that capacity.

As Tequila's glucose level began rising to normal again and as inactivated brain cells gradually returned to use, Tequila relived his experiences of the last five days. That is, his unconscious relived them. His consciousness was blissfully hypnotized to where the pleasure-principle reigned supreme. The memory-images indelibly impressed on his brain cells were reviewed, painstakingly recorded and evaluated for whatever new information might be revealed.

Nard hastily dialed Casan's apartment two hours later as he saw the Study approaching on the screen; which indicated Tequila was getting ready to prowl the room. A sleepy Casan answered but he was soon alert when he saw the screen on his visiphone.

Tequila cautiously entered the room and slowly surveyed it for signs of occupants. Finding none, he approached a window and luxuriously, but illegally, sharpened his claws on the enticing draperies. Then, springing lightly up on a table he sniffed at the books and the lamp in the center.

Casan saw the titles and grimaced; Science Fiction, no doubt! Earthlings had good imagination but their science lagged so far behind their ideas. Just goes to demonstrate how a primitive preoccupation with war and aggression can keep a ninth-class race from advancing to full acceptance in civilized Galactic society! He hoped this would take place soon for then the vigil of Earth would be over, although he had to admit that he was starting to like the four-footed observors and their individual bag of tricks.

Tequila, apparently bored with sniffing the table, glanced around the room again and his eyes lighted on the paper-cluttered desk. In an effortless leap he landed in the middle of the notes. With reckless abandon he batted an offending eraser to the floor and a letter, with its fold sticking tantalizingly into the air, received like treatment.

Casan groaned for he had not had time to read its contents but saw that the letterhead was from a scientist-associate of Tequila's master. He made a note to examine each frame of the film being made to see if maybe one of them contained a full shot of the letter before it joined the eraser on the floor. However, the cat obligingly spent considerable time on the desk and Casan was able to read nearly everything laying on its top. Tequila even helped out some by engaging in a mock-battle with the papers and thus scattering some of the top layer onto the floor, revealing the notes underneath to Casan's view.

Suddenly the cat jumped to the floor, ran into the kitchen and then through a hinged affair in the door to the yard outside. Somebody no doubt was approaching and the shrewd pet had decided to leave the scene.

"That's about it!" Nard interrupted. "Glucose is back to normal and that's all we'll get this time. I'm going to get him ready for the trip back."

With that, he broke the connection as the screen showed Tequila approaching the culvert which contained the disguised Beam apparatus. The cat's memories over the last few days had been duly reviewed and recorded.

Nard quickly removed the probes and the other apparatus which had been utilized. The hypnotized cat was given a posthypnotic suggestion to awaken after one hundred fifty heartbeats and to remember only the pleasant dreams he had experienced. In one hundred forty-five cat-heartbeats Tequila traversed the Seidler Beam and on exactly the one hundred fiftieth he awoke in the same culvert he had entered a few hours ago.

It was nearly daybreak when Tequila finally butted through his private doorway cut in the kitchen door. The young couple with whom he deigned to reside were already seated at early breakfast and as the woman saw his entrance she frowned at him in puzzlement.

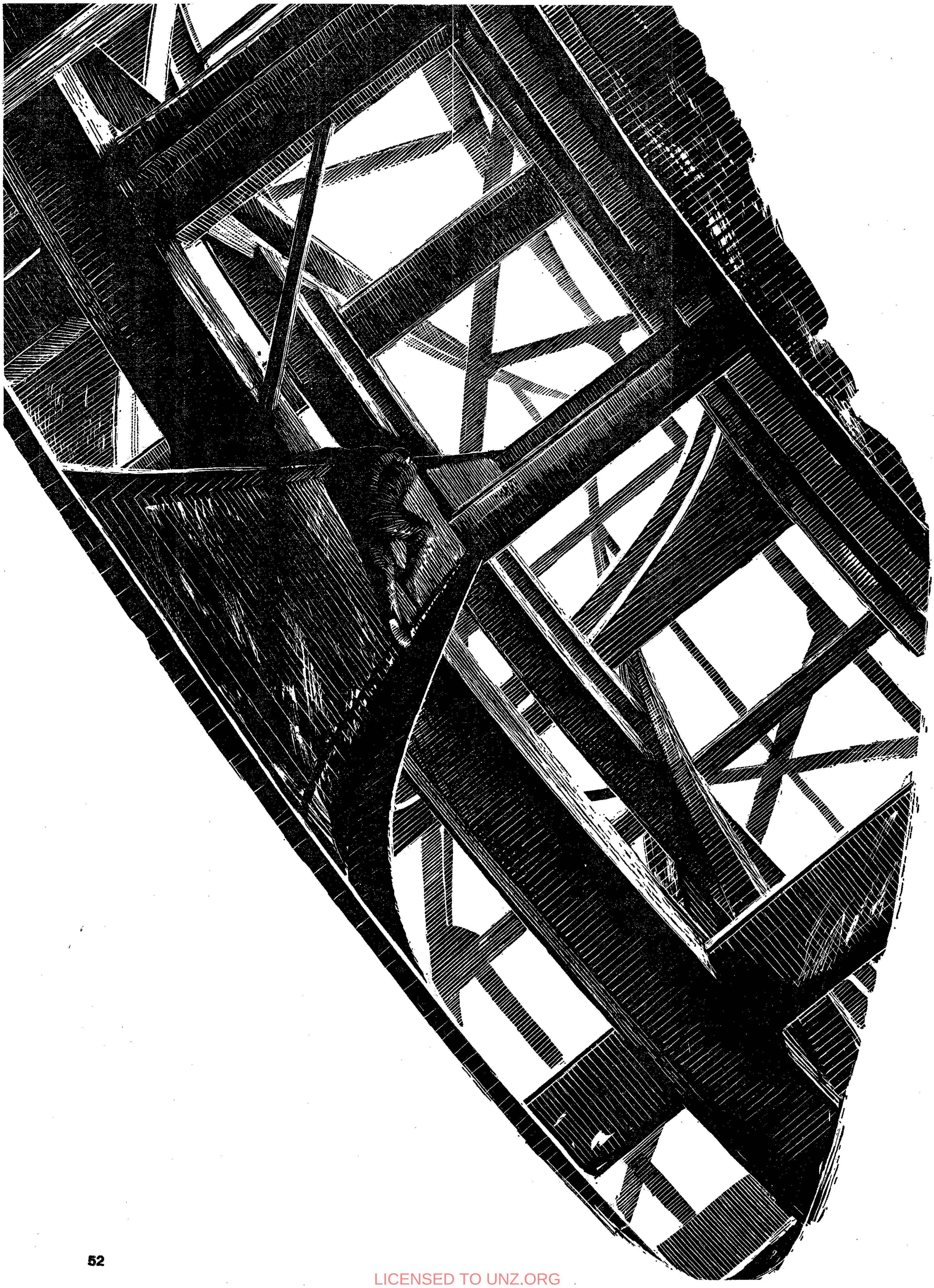
"Al," she addressed her husband's head over the morning paper, "where in Heaven's name do you suppose Tequila goes when he's out all night like that?" ■

the analytical laboratory

Because of lack of space in the February and March issues, there will be three Lab reports this month.

PLACE	STORY	AUTHOR	POINTS
	NOVEMBER 1963		
1	Take the Reason Prisoner	*John J. McGuire*	1.77
2	Where I Wasn't Going (Conclusion)	*Walt and Leigh Richmond*	2.23
3	Problem of Command	*Christopher Anvil*	2.91
4	Interview	*Frank A. Javor*	3.53
5	Pleasant Journey	*Richard F. Thieme*	4.33
	DECEMBER 1963		
1	Dune World (Pt. 1)	*Frank Herbert*	1.51
2	Thin Edge	*Johnathan Blake MacKenzie*	2.33
3	The Right Time	*Walter Bupp*	2.77
4	Conversation in Arcady	*Poul Anderson*	3.15
	JANUARY 1964		
1	Dune World (Pt. 2)	*Frank Herbert*	1.79
2	The Eyes Have It	*Randall Garrett*	1.97
3	Subjectivity	*Norman Spinrad*	2.73
4	Poppa Needs Shorts	*Walt and Leigh Richmond*	3.83
5	See What I Mean!	*John Brunner*	4.11

THE EDITOR



SPACEMAN

MURRAY LEINSTER Conclusion. The gulf between the stars is a small and readily bridged thing compared to the gulf of attitude between a spaceman's idea of instruments—and that of a special-effects man!

Illustrated by John Schoenherr

SYNOPSIS

On the way across the dark spaceport of Nelm to try for the mate's berth on the Rim Star, *Braden is attacked by five men who evidently intend to beat him into a hospital bed. Having been raised on a heavy-gravity planet he moves faster than they do, and when it's all over he is on his feet and they aren't. Then it appears they mistook him for someone else. He goes on to the ship. She is so huge that she's going to try to carry the enormously heavy steel for a spaceport landing grid as only part of her cargo, and she's going to try to land most of the equipment for a new colony by descending on Handel's Planet by rockets.*

The skipper, interviewing Braden, has very eccentric ideas of the qualities he wants in a mate, but Braden gets the berth. Then he learns that the ship's steward had eavesdropped on his talk with the skipper. On his way back to the spaceport gate he finds another man beaten unconscious. He was a member of the six-man crew of the Rim Star. *The five who tried to beat up Braden evidently found him easier game.*

The previously signed-on mate had been sent to a hospital, too. Picking up the crew next morning, Braden becomes sure they are the men who attacked him. Then he finds passengers boarding the ship. The crewmen respond to the presence of two women among the half-dozen passengers with unpleasantly anticipatory amusement.

Oddities pile up. Within twenty minutes of lift-off, Braden's blaster has been taken from his ship bag. He believes the steward took it. The skipper firmly orders the steward be left alone. Braden, however—with some violence—forces the crewmen to empty their ship bags before him. He finds strictly forbidden weapons among their possessions. Then he finds his own blaster in the steward's cabin. The ship is not yet in overdrive, and he reports formally that the crew plainly is organized for *insubordination or worse, and that the* Rim Star *should return to port and get a new crew. This one means trouble. But the skipper throws the ship into overdrive and it heads on away at many times the speed of light.*

Braden finds his own cabin "bugged" with a microphone and wires. He's just jammed the mike when the skipper appears. The control room is bugged, and the skipper's quarters—so the skipper observes dourly—but he can explain now. Some years back his wife and one of his two daughters was aboard the liner Melpomene, *which vanished in space. Against all probability the derelict ship was found two years later. Her crew had risen, murdered the officers and—after an interval—the passengers. The skipper has been hunting that crew ever since. He identified the steward, coddled him, made him skipper's pet, and lured him—so he says—to get the* Melpomene's *crew together on the* Rim Star *to repeat the* Melpomene *exploit. He gives Braden written orders to put the passengers in a spaceboat and abandon ship if anything happens to him. He is prepared for the crew's plans, but, to make sure, he has the ship mined so even if it were seized by mutineers, it would blow itself to bits afterward.*

The ship journeys on, blindly, in overdrive. The crewmen are dutiful but secretly derisive. The feel of something wrong—of impending trouble—increases. But there's nothing to put a finger on. One of the passengers—a girl named Diane—becomes important to Braden. The passengers want to make tape shots on the voyage. They are upset because they're confined in the cargo-ship's passenger space.

The ship is controlled by a huge computer-integration unit in its special armored compartment which no one is allowed to enter except specialists in spaceports. The astrogation unit brings the ship out of overdrive at Checkpoint Alyx, a sort of crossroads in space where ships come out of overdrive to verify their position and report to the Space Patrol. The same astrogator swings the ship for the next checkpoint and goes back into overdrive.

Braden considers that if there is to be a mutiny it should come after that moment. But nothing happens. The steward has set out a meal for him in his cabin. He is suspicious enough to taste the food carefully. The coffee is drugged. He warns the skipper, and goes to the passengers' quarters. He warns them. The skipper had a meal ready to be eaten, and it was drugged. A meal has just been served to the passengers. It is drugged, too. The production unit has only theatrical weapons, but Braden arms them after a fashion. The skipper, though, has insisted that the crew be allowed to reveal itself.

Braden waits, restless and uneasy. The steward comes to his cabin. He urges Braden to eat. They talk—grimly, on Braden's part—and the steward is chatty about the Other Side of Nowhere. Then there's the rasp of blaster-fire, and screams. The steward moves to draw a blaster and Braden knocks him cold. He rushes to the passengers' quarters—Diane is there—and finds that the forewarned passengers have beat off the crew which had expected to find them drugged and asleep. It's time for drastic action by Braden and the skipper. Braden goes to the control room to join the skipper. It's empty, except for a dead man on the floor. Then the skipper appears. He's shaken and ill.

The steward, treated as the skipper's pet, has found out the skipper's preparation to trap the crew of the Melpomene. *The weapons the skipper had ready, are gone. His blaster has been made useless. Even the mine designed to blow up the ship has been disassembled so it can't be made to explode. Even the emergency weapons in a spaceboat have been taken and the spaceboat's drive wrecked so it can't be used for escape.*

There are still weapons hidden in one place, behind a panel of the control. The skipper orders Braden to dog the control-room door shut and prepares to get them out. The crew advances outside. Without parley, they turn heavy-duty blast-weapons on the metal door. The skipper finds that this cache, also, is empty, just as the blast-weapons melt their first hole through the control-room door. The melted spot spreads . . .

PART 2

VI

Braden pulled down a lever on the wall. It was about a quarter-inch thick and as long as his hand. It was one of hundreds of similar levers arranged in rows in a four-foot-square section of the control-room wall. They were the levers controlling the fire-fighting fog system in the corridors and compartments of the ship. This one turned on the fog just outside the control-room door.

A dense, opaque and drowningly thick fog spouted from ceiling openings. Water, thinned by wetting agents, poured out of tiny nozzles. The pressure was so great that it broke into droplets of microscopic size. They did not fall. They floated. They spread. They turned the air into a palpable, heavy stuff which was somewhere between a gas and a liquid. No fire could burn in it. No man could breathe it. It looked like heavy smoke. It felt clammy; horrible! And a blaster in operation in it blew itself to pieces like a blaster operating under water. There were detonations. There were screams.

Braden fumbled at the pivoted metal dogs which had held the control door shut against all impacts. Steam came through the melted openings. He flung the door wide, and the heavy white stuff of the corridor flowed in like an infinitely viscous liquid.

"Come on!" snapped Braden. "Hold your breath!"

He thrust his blaster into a pocket for protection against the wet. He plunged into the white opacity. He stumbled over something which made noises like escaping steam. It was a blaster, shorted and ruined, its batteries melting themselves down as they discharged.

He ran, holding his breath like a man diving. He felt, rather than heard, that there were blundering figures in flight ahead of him. The skipper followed, guiding himself by a hand against the wall. Braden knew that his face was wet. His hair became saturated. Water flowed down his neck. He felt as if he were wading rather than running, and he began to worry intensely that his blaster, even in his pocket, might become soaked and useless or worse. He tripped on another blaster busily destroying itself on the floor. He almost fell. He needed to breathe. He became desperate for want of breath. He'd strangle—

The white mist grew brighter. Bright. His head came out of the white stuff and he gasped in breathable air. The corridor here was filled from wall to wall with fire-fighting fog which flowed very slowly away and ahead of him. He saw stirred-up trails of the vapor, like those of the swirlings of mist above chilly water on a warm day. But here the stuff looked like milk. The crewmen were far ahead, still in flight, stirring up the stuff as they fled.

Braden snatched out his blaster and fired, at the last instant before the curve of the corridor wall hid them.

There was a scream and a monstrous turning of vapor into steam. Then nothing.

The skipper blundered into view, seeming to rise out of a thick white nothingness which streamed down about his head and shoulders with infinite deliberation. He gasped and filled his lungs as he waded toward Braden.

"I think," said Braden, "that somebody got hurt. Whether any were killed is another matter. Are you all right?"

The skipper rumbled. His face was ghastly. Water-soaked and stunned by disaster, he could take no courage from this setback to the mutineers. He had been out-guessed and outthought. He was in a state of shock.

"They'll still have weapons," said Braden. "They got those you stored by the bomb, you tell me. But also they got the ones that were in the hiding place we just found empty. You had blasters enough to kill them with—but now they've got them to kill us with! But they're off-balance for the moment."

The skipper made a hopeless gesture.

"Mr. Braden," he said thinly, "I can't hope to kill them now as I hoped to. But . . . I will kill them somehow! You—"

He stopped. His forehead knitted pathetically.

"You haven't my reasons," he said helplessly, "but you have done very well, Mr. Braden. I would like to . . . spare you what is to happen in this ship. You are . . . you are concerned about the passengers. I would like for your sake to have them escape. But—"

Braden's muscles tensed suddenly. He snapped:

"I've two pocket blasters, but—there are the spaceboats! You told me to take to a boat!"

The skipper's eyes were despairing. It took seconds for him to understand. Then his despair turned to blazing hope.

"Come, Mr. Braden! You do very well indeed!"

He instantly reassumed the role of leadership. It was inevitable. A man does not command ships of space for half a lifetime without acquiring the habit of taking charge of all situations in which he finds himself. Now the skipper waded forward in abruptly returned confidence. He came to a panel in the side wall. It was only knee-deep in fog. It would be one of those almost-unused routes between the inner skin and the hold-plates of the *Rim Star*. They had no part in the operation of the ship while in space. They were used only for inspection and perhaps access to places needing painting or repair.

The plate in the wall swung out. There was a narrow catwalk beyond it. It had metal handrails. It reached out across emptiness. Lights burned feebly at relatively great distances in a web of angular struts and braces designed to maintain the stiffness of the ship. The lights burned unseen for years on end.

Braden closed the rarely-used low door. The skipper led the way, head erect, with all his self-confidence returned.

There were, of course, three spaceboats—three lifeboats—in their proper blisters in the *Rim Star's* skin. Any one could carry all the normal ship's company, but there were three because anything that could require abandoning-ship would almost certainly have required the destruction of a good part of it first. Hence boat-blisters at widely separated parts of the hull.

There was other forethought in the matter of the spaceboats. They could not, of course, be fueled and provisioned for journeys of indefinite length. A fully loaded lifeboat had a maximum range of just about five light-years. In some parts of the galaxy that almost assured ability to reach a colonized world—in the denser star-clusters especially. But there were sectors in which one's best hope would be to find a merely habitable one. So there was emergency equipment for a castaway landing. Seeds, tools, instructions for agriculture and even data on the recognition of smeltable ores. And in case of inimical animal life—it was long since evident that there was no other race like mankind in the galaxy—in case of dangerous beasts there were weapons. Castaways would have material, arms, and information for survival.

It was the weapons that instantly restored the skipper. He strode along the narrow catwalk whose handrails barely allowed his bulk to pass. He rumbled premonitorily:

"Mr. Braden, I think—"

The ship's gravity went off. He and Braden, together, became weightless. Braden grabbed at a handrail as he found himself floating. The lights went out, and though they were faint and widely separated, the loss of them was horrifying. A mooing, hooting, dismal noise filled the air. It was the maximum-emergency signal, intended to be set off from the control room in case of imminent disaster. All through the ship compartment doors swung shut, sealing the ship into scores of air-tight compartments. They were actually collision-doors. Gravity came on again. There was the crazy, intolerable sensation of coming out of overdrive and after seconds the equally intolerable sensation of going back into it. The collision-doors opened. The lights came on and gravity went off. The doors opened again and immediately closed once more. The mooing noise stopped. Gravity went on and instantly off, the lights flickered insanely, and again the ship came out of overdrive.

The lunatic sequence of random operations continued, but presently the tempo seemed to slow. Braden clung to one siderail of the catwalk. The skipper clung to both. The phenomena came at greater intervals—but not consistently—and at long last seconds intervened between them. Then half-minutes. Then they stopped.

"Shorts in the control room," said Braden. "The fog rolled in and wetted the contacts. Seems to be over now, though."

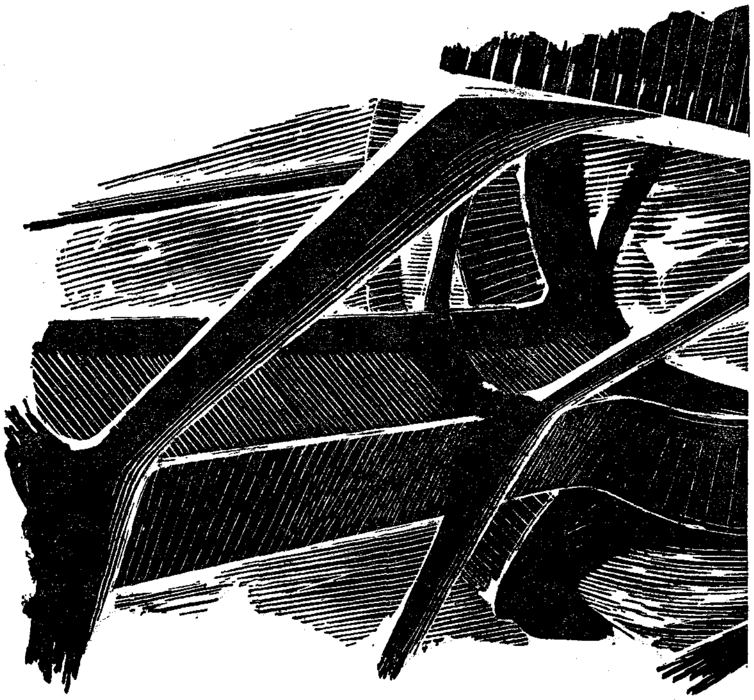
The skipper rumbled. The ship was back in overdrive, the dim lights shone steadily, and their feet rested solidly on the metal plates of the catwalk.

"No doubt," growled the skipper. "I've an idea, though, that those devils believed for a moment that we'd gone into the other side of nowhere. Eh? Too bad it wasn't true! But they'll realize it was shorts, as you said. Too bad!"

He went on along the catwalk. Braden followed. His brain nibbled at the skipper's reference. The other side of nowhere was a tall tale that had become folklore. Nobody knew how it started, but all over the galaxy there were absurd tales of ships blundering into an impossibly wrong sort of space where before was behind and below was above and ships reacted insanely to their controls. One heard it told with great detail of certain named ships, but those ships always denied it. They said they'd heard the story of other named ships. But they denied it, too. No man ever claimed to have been on a ship when it happened, but it persisted like other fabulous stories which can never be run to ground. Authorities on folklore said it was a fragment based on a science-fiction tale of centuries before, a story called "Spaceman" by a forgotten writer named Leinster. But all forecastles discussed it, and very many crewmen believed it obstinately.

The ship again drove through emptiness at multiples of the speed of light, and conditions in her interior returned to normal. The incident was frightening, but harmless. It was not likely to move the mutineers to reform. The time had passed for that.

The catwalk ended at a second metal panel in the wall of the other corridor between the two ends of the ship. The skipper unlocked it from inside and stepped confidently out. It should have been incautious, but the *Rim Star* was very large.

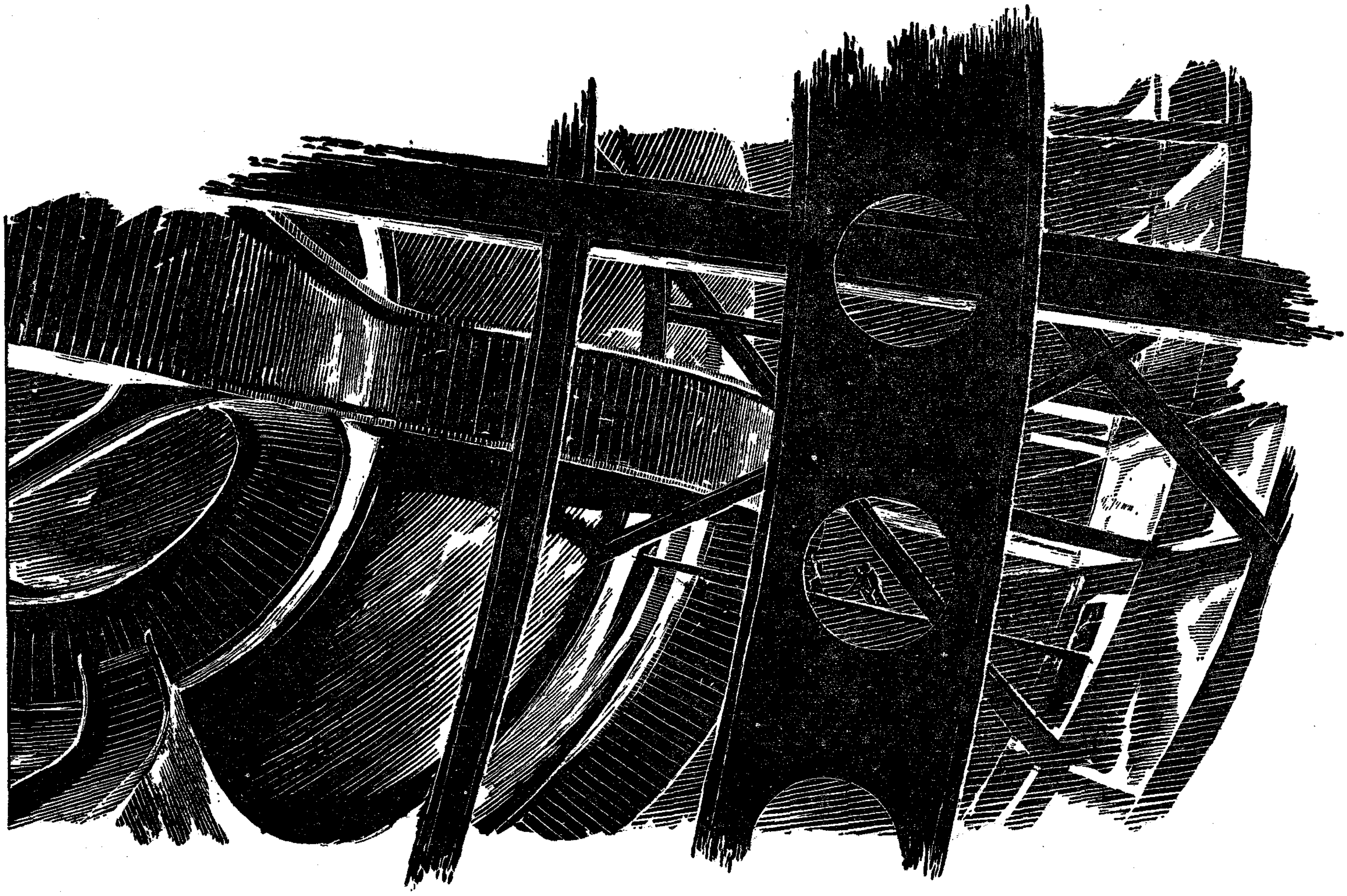


There was no alarm. A taller door, marked as that of a lifeboat blister, was almost opposite. The skipper opened it boldly. Braden followed him. There was an additional door inside which made the entrance into an air lock. They went through. A feeble light glowed here. They were in the blister.

They looked at the spaceboat. Its size was proportioned to that of the ship. It was sixty feet long and fifteen feet in diameter, and it looked very much like an even more clumsy miniature of its parent ship. It was larger than the ships that first passed between planets in the first solar system, and the first interstellar voyages were made in ships but little larger. Perhaps a tenth of its volume was available for human use. The rest was stored food and supplies and the disproportionately large drive necessary. It was strictly for emergency use. The inspection seal seemed unbroken on its port.

The skipper touched the seal. It gave. He stared at it, and then went in. Braden waited. The mutineers were better armed than the skipper and himself in the proportion of a riot squad to two peaceful citizens.

There was stillness. The silence of space is absolute. The silence of a huge ship, traveling light-years in hours, is no less complete. It seemed to Braden that he could hear the beating of his own heart and even the rustling of blood in his ears. Once he believed he heard the tiniest



of all possible sounds—metal striking on metal somewhere. But it was infinitely faint, and it was very far away, and it was not repeated.

The skipper came out of the spaceboat. His hands were empty. His features had lost all life again. He said in a thin, breathless voice:

"The . . . steward's beat me again. No weapons."

In the dim light of the lifeboat blister he could be seen to be raging, literally maddened by this new disaster. Braden grimly handed him a pocket weapon. It was the one he'd taken from the steward in his own cabin. The skipper took it.

"Not much, Mr. Braden," he said fiercely. "It's not much! But it's enough to go into business with! The business of killing pirates! Come along with me and we'll wipe them out! Kill them! Move in on them in force! A pity for them to die easily, but—"

Braden said sharply: "You're forgetting the passengers!"

The skipper was like a man faced with what he could not endure. He couldn't admit that he was beaten. He had to pretend what he knew was not true. A man can die of the proof of his own incapacity. The skipper said:

"Mr. Braden, I've this!" He tapped the pocket-blaster Braden had just given him. "Thanks to you, I've this! And when I'm finished with those devils, your passengers will be as safe as if cradled in their mothers' arms!"

He did not believe it, but he had to pretend to believe it, or he was lost. It was better to be killed, believing this, than to admit defeat.

"The odds are bad," snapped Braden. "They're impossible! Only two of us—"

"One, Mr. Braden!" said the skipper fiercely. "I know this ship, Mr. Braden, as I know the chin I shave each morning. I'll take care of the crew alone!"

It was absurd. It was utter folly. The skipper knew it. But he would get himself killed to keep from admitting to himself that he'd been caught in his own trap and that only being killed remained to him.

"Somebody," said Braden grimly, "has to think of the ship and the passengers. I'll ask authority to look after the ship while you go hunting mutineers—if you must."

The skipper rumbled. Braden snapped, curtly, what he meant to do about the passengers for their remotely possible safety. He did not so much ask authority as declare flatly that he took it. There is a point where subordination is simply silly.

"Very well, Mr. Braden," growled the skipper. "Take the watch until relieved. I'll do better with the ship off my mind. I give you full responsibility for the passengers. Use your best judgment for the ship and for them while I attend to the crew!"

He thrust past Braden and went out into the corridor. There was no sound. Braden followed him a moment later. He'd vanished.

Braden, frowning, opened the door of the catwalk they'd used to get here. He fastened it behind him. To all intents and purposes he vanished, too. He did not expect ever to see the skipper alive again.

One instant after closing the corridor plate, he had left the catwalk. He was in that maze of struts and girders which—with very occasional catwalks—filled the space between the ship's holds and her outer skin. He saw a gigantic steel precipice which was a cargo-hold. There were other holds, the size of monster warehouses. Each would contain a large part of what a new colony of thousands of people would need to become self-supporting. Between them there were myriads of bracings; weblike labyrinths of steel struts and strength-members. Together they made the ship more firm and less flexible than a similar mass of solid steel.

Braden began to climb downward through the bewildering spars of metal. There was silence. There was only the dimmest of twilight in the webby space. There were only feeble yellow lights and those nearby were blanked by nearer girders as he changed position, and those farther away twinkled insanely as he moved. He scowled as he descended. This kind of behavior was contrary to all his instincts. His impulses would lead him to join the skipper in a furious assault upon the mutineers. A little while ago, that could have been the rational thing to do. But no more. Yet he yearned hungrily for freedom to do battle, whether with fists or blasters, instead of think coldly of what was wise and practical and sensible.

He tried to hurry. The mutineers didn't know what had happened to one of their number, and they couldn't have any clear idea of what had become of the skipper, but they couldn't fail to know what Braden must do next. He had to join the passengers and try to do something for their safety. The steward would surely realize it. Unless the mutineers were panicked—a temporary state, at best—he'd be leading them now to clean out the passenger-space before Braden could gain what added strength the male passengers might give him. It would not be much.

He foresaw the complete impossibility of defending the passenger-section. The mutineers had lost at least two heavy-duty weapons in the fire-fighting fog, but they had more. There would be no weapons in any of the spaceboats, now, and the skipper had had powerful blast rifles in the control room cache. The mutineers would be even extravagantly equipped for murder. They could melt through the walls if necessary to destroy the passengers. And they should be on the way sternward now.

He was moved to desperate haste. Once he slipped, and his holding hand jerked loose, and he fell. But the struts and girders were like tree limbs in their distribution. He fell no more than a dozen feet before he caught himself, though it felt as if his arms would be pulled from their sockets. Then he went on, more cautiously this time.

He growled. He wished bitterly that the *Rim Star* were like those old-fashioned ships now relegated to minor runs between solar systems. Those ships' drives were considered engines, and engineer-officers cobbled them and swore that they were superior to new-fangled automatics, and men felt loyalty to their ships and believed them better than any others in space. They would fight for them. Mutiny would be unthinkable.

But the *Rim Star* was a machine. Its drive-units were failure-proof. They were sealed in an armored compartment after inspection by specialists aground. The astrogation system was no less unhuman. The *Rim Star* was a complex, soulless device which was wholly indifferent to the humans aboard it. It drove on blindly.

He heard an ominous sound. A blaster—a hand weapon—made a snarling noise. It was nearby—higher and closer to the bow, but certainly within a few hundred feet. It could be the skipper. He might have attacked the mutineers in an utterly hopeless attempt to kill them with a handblaster before they could kill him. A tumultuous uproar of heavy weapons answered. But it kept up too long to be a simple suicidal attack with the purpose of getting killed. There were blasts at odd intervals for minutes. It could be that the skipper had sniped from a cracked-open corridor plate and then retreated to the dimness in which Braden moved now. There were other blasts from heavy rifles, as if the mutineers were trigger-happy and expected further sniping.

Then there was heavy firing, and somehow it sounded final, as if the men who fired were certain that they killed their enemy—who would be the skipper. If so, everything was left up to Braden.

He almost flung himself downward. The crewmen, though, would be marching down ramps and steps which in succession circled the whole ship. They would move faster forward, but probably not downward as swiftly as Braden.

He came to a catwalk which should be right. Breathing hard from his exertions, he made his way to the corridor plate. He opened it and stepped out, and a pellet of blindingly white light flashed past him. He heard a blaster-snarl.

"Stop it!" he snapped.

He was within ten yards of the passengers' quarters' doorway. Duckworth had been on guard. He saw Braden appear and fired. He'd missed. It was wise to miss with a merely theatrical weapon. Braden went past him, angered.

"That shot tears it!" he snapped again, as he went in. "But shoot first if anybody comes!"

He was in the passengers' saloon. Diane had snatched up a hand-blaster. She gave a little gasp of relief at the sight of him. Fortescue had grasped a theatrical rifle when he heard Duckworth shoot. Hardy faced the door grimly, a hand-blaster halfway drawn. Derr Carmody alone seemed half-fainting, with her hand to her lips and her eyes filled with terror.

"Come along!" said Braden sharply. "Everybody up! The crew's on the way here. The skipper's killed one of them, but they're heavily armed and they're coming to kill you! Everybody up!"

He gave them no time to ask questions. He hurried them out. There were two spiral corridors from end to end of the ship. The mutineers would arrive by the corridor to the right. He shepherded his charges to the left. There had to be two passageways, for safety's sake alone.

They passed the place where the stair went down to the exit-port. The port was at the bottom of one of the giant fins on which the *Rim Star* stood upright in port. Braden thought of something and seized on the idea.

"Go on ahead," he commanded. "Right with you!"

He raced down the stairs. The personnel port, of course, was an air lock. Braden hauled open the inner door, jammed it against closure, and held his pocket-weapon within inches of the door remaining between himself and interstellar space. He held down the trigger, and swore at the smallness of the effect. Heavy-duty weapons had burned through the control-room door as if it were butter.

But presently—it seemed an agonizing length of time—a small place glowed red. Cherry red. Incandescent. And then the ship's air-pressure blew out the semiliquid metal and screamed through the small opening to beyond. It was not a large hole, of course. It was less than an inch in diameter. But air raced out and Braden flew up the stairs again. He reflected dourly that this was the kind of trick the steward might think of. Smart. And safe. He didn't like it, but it was necessary.

He reached the top of the stairs and there was a mournful, mooing, dismal sound. A monitor panel somewhere had reported a drop of air pressure here. The maximum-emergency signal went on. Collision doors closed all over the ship and it was divided into innumerable air-tight compartments.

"Quick!" snapped Braden. "Run!"

He drove them on. Derr Carmody stumbled on a section of stairs. He picked her up and ran with her. Already the air was thin. There was a considerable volume to escape from this compartment, but there was need for haste.

The corridor ahead was blocked by an automatically-closed collision door. But there was an escape-section, to be worked by hand. Braden opened it and rushed the others through. He panted orders. Diane grasped his meaning and ran on ahead.

Only Fortescue stayed behind. He said uneasily: "Anything I can do?"

"Get them to the next door. Fast!" commanded Braden.

Fortescue ran on, vanishing around the curve of the corridor. Diane called. Braden punctured this door also with his blaster. It was a smaller hole than the one in the outside lock-door. Air whistled through, ultimately to go free into space.

Braden finally caught up with the others. Once more he worked the escape-section and got them safely through.

"They can't follow us now," he said savagely. "I made an air-leak. One compartment's empty of air and another is emptying into the first. But now we've got to move faster than ever! We can't go back the way we came, and they can head us off by way of the bow!"

There was sweat on his forehead. He'd asked for the responsibility of the ship and the passengers, but it involved flight, hiding, trickery. He preferred violent action. He disapproved of himself as he rushed them onward—one closed-off section after another. Derr Carmody panted that she had to rest. The stairs. The ramps. She had to rest! Braden raged at her.

"We haven't time!" he snapped. "Keep on or be left behind!"

He knew he wouldn't do it, but the threat might keep her going. But the corridor seemed interminable. Where it was not steps, it was ramp. It was a matter of climbing, climbing, climbing.

He drove them on. Their behavior could have been predicted. Just as a group of men, long isolated, forms group-patterns of behavior with tacitly assigned differing roles to each, so even a mixed group will set up a pattern in a time of emergency. Here Braden was obviously the leader, and Diane was automatically his chief lieutenant. Fortescue was prepared to do loyally whatever he was told. Duckworth might be third leader in case of need, and Hardy—Braden somehow left Derr Carmody to him. In an emergency Hardy would always be the man who looked out for details the others did not notice, and stoutly took care of the weakest. Who, of course, would be Derr Carmody.

"There's a lifeboat blister ahead," said Braden brittlely. "We're making for that."

They couldn't try to escape in the spaceboat, of course. It wouldn't be a gamble. It would simply be trading immediate peril for a slower death. In any case it was unthinkable to abandon ship without at least trying to recapture it, as a matter of plain professional instinct.

They came to the lifeboat door. Braden waved them on. He darted in. This spaceboat was identical with the one the skipper'd gone into. The inspection seal on its door was broken. Braden rushed in, made sure the arms rack was empty, and rushed out again. He smashed certain instruments, which would jam the outer door immovably and report to the control room that the spaceboat had gone away from the ship and rode somewhere in the space between the stars.

He overtook the others, leaving the inner lock-door open to draw attention to itself. The passengers were huddled at the next collision door. Derr Carmody again threatened hysterics.

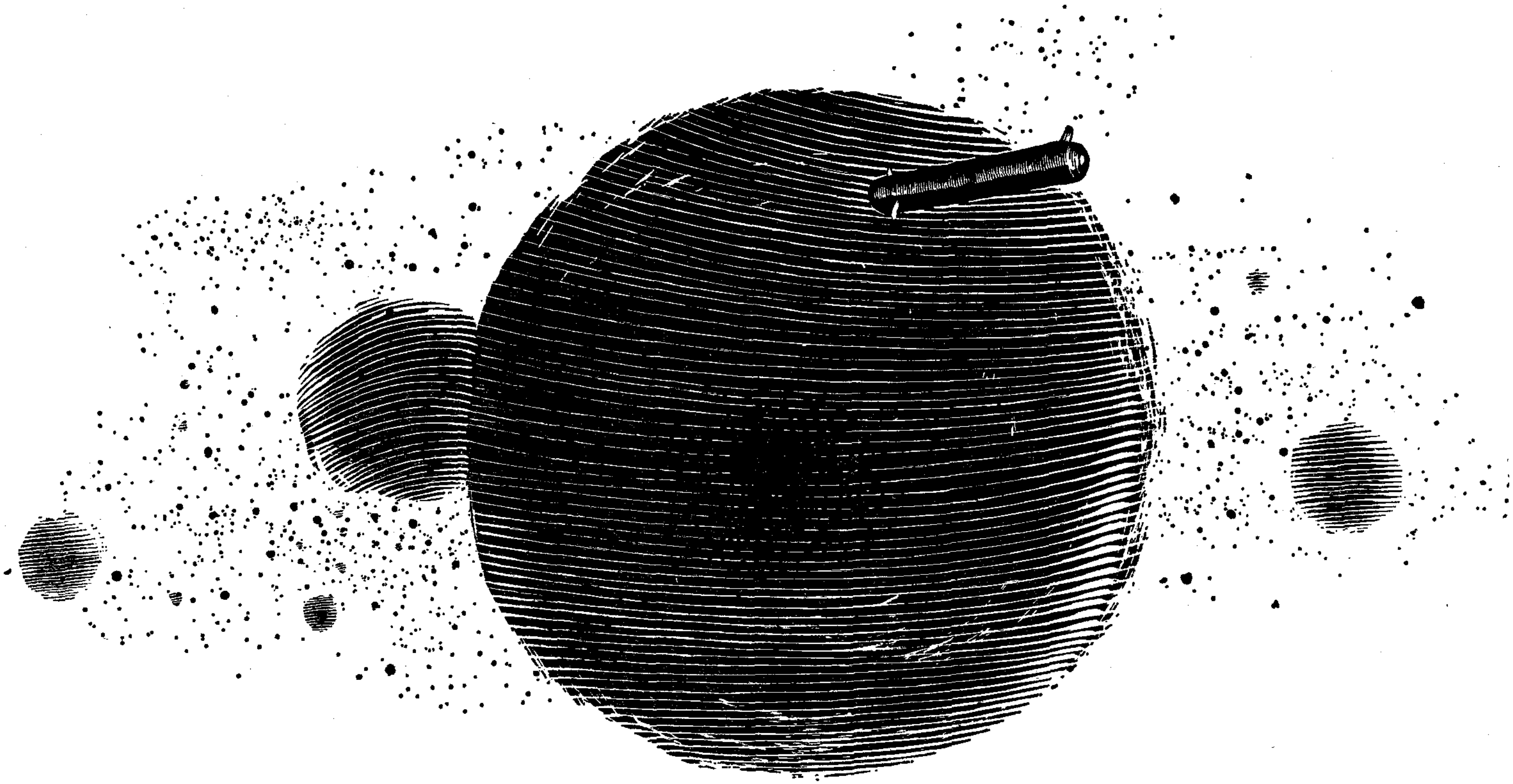
"If we aren't killed in the next five minutes," said Braden to the group in general, "we may live on for some days. Through this door, now—"

They went through. Up more stairs and more ramps.

Duckworth panted, but gamely toiled on. Another collision door. Another. Then Diane turned a white face to Braden. There was the sound of muffled voices.

Braden drove his followers onward with a pantomime of drastic threats. At best it would be horribly close. But they did reach the destination he'd chosen before parting from the skipper. There was a normal, actual, double doorway with two doors set in it. It was on the inboard side of the corridor. It was the door by which spaceport technicians aground went to examine the Lawlor drive-units and the astrogation device. It was a large door, in case units of one or the other needed to be replaced.

He opened the doors and rushed his following through.



Before the last had vanished, however, the sound of voices grew suddenly louder. Men had come through the collision door ahead. They were not fifty feet away, but the corridor was curved. Braden was inside and had the doors almost—almost!—shut at the last conceivable instant before he'd have been sighted.

He drew back and held his inadequate pistol drawn and leveled. If they opened the door he'd try to traverse them all, belly-high, before they could swing their vastly more powerful weapons and kill him.

He waited. He raged because he waited. He would have preferred, and it would have been easy to convince himself, to leap out in furious, all-out attack, staking his greater quickness against the greater armament and number of the mutineers. If only his own life had been at stake, impatience alone would have sent him into a whirlwind charge to try to kill the mutineers before they could pull trigger to kill him. And he might have been successful.

But his life was not his own. There'd been blaster-fire in another corridor while he was going down to lead the passengers here. The skipper had been involved. It could not have been anyone else. The sound of the shooting implied that the skipper had been killed. If that were true, then, though Braden killed every mutineer, if he were killed Diane would die. Inevitably.

The *Rim Star* could not be handled by the uninstructed. The ship could make no decisions. It could not have purpose, or will, and it could not operate except under direction, and one had to know what directions to give and how to give them. The ship could go blindly to her destination and come out of overdrive there. But her passengers could not even work the communicators to call the incomplete new colony for help. They might be only a light-hour—six hundred and some-odd million miles—from help and yet be unable to call for it.

If Braden were killed, the ship might come out of overdrive at Handel's Planet and still drift aimlessly on past it into boundless space. And therefore, though he raged, he could not risk his life unless it was unavoidable.

The mutineers went past the doorway where he waited. At least one was within two yards of him at one moment. They went on. When the sound of their voices was muted again by the next collision door, he closed and fastened the double door behind which he'd stood guard. And he was ashamed.

But he made his way to that sacrosanct enclosure which held the drive and the astrogation device. It was massive. It was large. It was impregnable to almost anything imaginable. Held immovable within the system of braces and strength-members of steel, it seemed incredible because of its lurid coloring. But that was the cerium sulfide outer case. Electric arcs could not melt it. Beneath, there was a two-foot-thick shell of tungalloy. There were no drills which could pierce it. There was a generous door to allow of moving equipment in and out, and it was held shut by a combination lock which no one could force.

It was the ship's drive room, and it was forbidden to be entered save by authorized spaceport personnel. Only in one specific emergency could a ship captain use his knowledge of the combination to enter. The situation on the *Rim Star* was not that one. But Braden pressed the numeral-buttons in seemingly interminable sequence, and there was no strident clanging bell to say that someone tried to tamper. The door opened.

Braden ushered the others inside. The lights of the drive room showed the drive itself; clumsy-seeming and composite, made of many units bolted together, capable of lifting and driving the *Rim Star* which was the largest ship in two star-clusters. The drive made use of megamperes of electric current, able to melt even itself to slag. It was contained in this cataclysm-proof shell of tungalloy and cerium sulfide lest some minor mishap make it melt down the ship itself in mid-space. It was not a place for meddlers.

The drive unit was two man-heights high and twenty feet on a side. Enormous cables came out of it and disappeared. Lesser cables joined it to the astrogator unit. Lesser cables still came from the outer parts of the ship and passed to that complex and solidly encased combination of computers and inertia and gyro controls, with relays and memory banks and tape readers. That was the astrogator. And the interior walls of the drive room were solid banks of instruments duplicating those in the control room, and more.

None of this was supposed to be seen except by spaceport technicians. These instruments were for the testing of the drive and astrogation equipment. In the two assemblies there were literally millions of parts, counting connectors and transistors as parts. The drive-room instrumentation allowed of the testing of every one—individually, if necessary. The working devices had duplicate and triplicate circuits, of which any faulty one cut itself out automatically. This was for safety. But safety also required that such cut-out circuit elements be replaced. So at spaceports fantastically high-salaried technicians checked each drive room while aground. If a single element was inefficient, it was repaired. If a transistor became poisoned, they replaced it. There was even a separate air-system for this room, to keep the air at the requisite purity to serve—as it does—as an insulator.

The equipment for inspection of the ship's essential machinery was as complex and complete as the working equipment itself. Nothing simple could handle the job.

Braden supervised the closing of the massive outer door.

"Now," he said with fine irony, "we are safe from violence. But that's all!"

Diane looked carefully all around. Hardy pointed interestedly at vision screens on the walls. They were blank, of course, with the ship in overdrive. But they would duplicate what the control-room screens showed. This was necessary for testing. Fortescue stared blankly. He was one of that extraordinary number of people who never understand how things work. He looked helplessly at Duckworth.

"I've got to find some food and water," said Braden grimly, "but first we'll try to let the mutineers come to feel sure we did take off in a lifeboat. We've got to let them feel that they've won. It's most likely they have, at that!"

Diane said: "But if they can't get at us?"

"They can empty the ship of air," said Braden, "and then we can't get at them or anything else. We can do a lot of things from here, but if they choose to take off in a spaceboat and leave the ship to bleed air behind them, there's not a thing we can do."

"Then why—"

"Because if they don't suspect us of being alive," said Braden angrily, "and if they don't feel like going to all that trouble . . . why . . . the ship can be astrogated from here. They'll smash the controls in the control room anyhow, after they've got the loot they want. But if we hide—like rats—they may omit to bleed the ship empty and—like rats—we can ultimately come out and take over the ship again."

Diane looked at him very thoughtfully.

"But you don't like that. And you don't really believe it."

"I don't like it," agreed Braden savagely. "And I don't really believe it, either. They've won, but we gave them trouble. So they'll tend to smash something to get even with us, or fate, or chance, or what have you."

He raged, really, because he hadn't attacked the mutineers in the corridor. He'd taken a vast pride in his ability to handle himself in troublous situations. He was faster with feet and fists and thought than most men. But in this case he'd had to act like a weakling because of the passengers. As he saw it, he'd have to continue to act that way. And he was ashamed.

Hardy moved from his inspection of the instrument-lined walls. He looked at Duckworth and said warmly:

"Beautiful setup for tape! Beautiful!"

Braden did not understand. Diane explained apologetically: "He's saying this would be a good set for some of the scenes of the picture we were to shoot."

"No!" protested Hardy. "That setup of screens! For the Other Side of Nowhere. Beautiful!"

Diane stared. He beckoned. She went with him to see. Braden ceased to notice. He clenched his fists. He could do nothing but what he'd done. He couldn't gamble the lives of Diane and the others on his own quickness and accuracy with a blast-pistol. But instead he was hiding, and trying to trust to the unconscious mercy of men who'd laughed gleefully at the prospect of having Diane at their mercy. He ground his teeth.

Diane came back. She looked startled.

"Look!" she said urgently. "Mr. Hardy's pointed out that the vision screen setup here is like the process-shot setups for special effects in picture-making! There are cameras outside the ship and they send images to the control room—and here at the same time so the control-images can be tested! In port! Do you see?"

Braden did not listen. He was disgraced in his own eyes.

"From here we can control what the control room sees!" said Diane breathlessly. "We can fake what they see! Give us our cameras and we can make them see anything we want them to!"

Braden said: "Then what?"

She spread out her hands.

"We might . . . frighten them. So they'd be anxious to leave the ship without even letting out the air."

"Frighten them," said Braden angrily, "and they'll suspect we're still here! Which we can't risk!"

He was bitterly ashamed that Diane should see him refusing to risk anything because she would become endangered. She said:

"But somehow . . . Your expression looks like you don't want just to sit still and wait. I don't think you want that! What would you like?"

Derr Carmody said dramatically: "I feel faint . . . A glass of water, please!"

"There's none," snapped Braden. "You'll have to wait!" He turned to Diane. "There's just one kind of frightening that would do any good. It shouldn't seem to be arranged by anybody. It should be something overwhelming that would stun them, bewilder them, horrify them past any idea of facing it or finding an answer to it. Something not caused by human agency. Frighten them like that—"

Diane brightened. She smiled at him.

"That sounds like—the Other Side of Nowhere!" She whirled upon Duckworth. "You see? A setup for process, and we are set for special effects anyhow! Have you got the script?"

Braden blinked. But Diane laughed pleasedly. Hardy came closer. A most businesslike conference began immediately. It startled Braden. Diane made cryptic statements, and Duckworth nodded soberly, and Hardy added other unintelligible remarks having to do with zooms and superimposition and value reversals. The cavernous, instrument-lined drive room seemed to come alive. Even Fortescue brightened and said something without meaning to Braden, but which all the others seemed to understand and to approve.

Then Derr Carmody drew near and said jealously: "But what is the situation? What do I do? What's my role?"

"You haven't any," said Duckworth promptly. "This is for background, Derr. We've not only this set—which we'll use presently for our own tape—but we'll have the special effects and process stuff we'll work out for Braden, here. He'll get us our cameras, and you can work out effective scenes to make use of what we'll be doing!"

Braden was ignored. He was amazed. The five passengers, who had been utterly helpless and wholly subdued before, now were suddenly brisk and businesslike and talking pure gibberish with every appearance of knowing and meaning what they said.

He gathered an impression of mysterious conclusions agreed upon, and wholly meaningless actions determined upon, and problems of complete obscurity mentioned, and argued about, and solved. Even Derr Carmody listened with a jealous, comprehending absorption.

Later, Diane tried to explain to Braden. Her eyes were shining.

"Before," she said trying to explain her change of mood, "I felt we were quite a handicap to you in a very nasty situation. Now we can do something to help! We're really a good production-unit! Mr. Hardy is marvelous at special effects. I'm not too bad, either. Mr. Duckworth is the perfect man for the script. Of course Tommy Fortescue and Derr—my mother—aren't particularly handy for this job, but we'll use the shots to include them later for the commercial tape."

"If you'd tell me what you expect to do—" protested Braden.

"Why," said Diane confidently, "we'll do what you said you wanted! You told us what you wished could be done. It can be. But we do need our cameras. When you go after food and water I'll come along—"

"You won't!" snapped Braden. "If that's what you want, I'd better try for it now. I know where the crewmen ought to be. They're on the near side of the compartments I emptied of air. They'll waste time cursing the lifeboat they think we left in. And anything missing from your quarters they'll think you took along—if it's missing right away. You say you want your cameras? Why?"

Again her explanation was not fully convincing. But food and water was needed, and the lifeboat was ostensibly out in space, with astronomical distances and astronomical odds against it ever touching ground again. Now was the safest time to take anything wanted to be taken from the passengers' cabins.

Braden went out of the drive room with an arranged code of rappings to identify him on his return. It seemed to him that Diane looked especially pale when he departed, but she smiled brightly.

Again the ridiculous gymnastic climb among the struts and strength-bars of between-the-holds. Tiny lights glowed yellowly and were blotted out and appeared again as

Braden clambered downward. There was utter stillness.

It was hard not to take the stillness as ominous; as the silence of men in ambush waiting to pour upon Braden, without warning, such searing flames as had melted through the control-room door. But the ship was huge. There was no moving part in its drive-apparatus. The air-circulation system was noiseless. And there were very few persons aboard. Five crewmen and the steward, as enemies, had been reduced by one. Braden considered the skipper probably dead, too. In a ship a quarter of a mile long and an eighth of a mile in circumference there was necessarily much space with no humans in it.

Braden reached the lowermost catwalk. At its end he cracked the doorplate leading to the corridor. He emerged.

The skipper rumbled: "Ah, Braden! You have them tucked away?"

"What—"

"I'm after provisions," said the skipper, comfortably. "Right after I left you I sniped a mutineer. They went mad, Braden, flinging blaster-bolts about at random. And I didn't kill him! I've decided to be more subtle. I've laid out a line of work to be done. It will need patience. That will require food. So I came down to get food from the passengers' emergency store."

"So did I," said Braden. "And cameras." He was silent for a moment and then said fiercely: "Sir, you want to stay hidden for the time being. You don't want to do anything! They think I abandoned ship in Number Three lifeboat with the passengers. If they can think you went along, too . . . Listen, sir!"

He explained the present activity of the passengers as professional contrivers of special theatrical effects. The skipper rumbled disgustedly:

"No! That won't serve, Braden! We haven't the same purpose. I've my own plans for the crew. When they are all dead or inactive I'll let you know by general communication loud-speaker. Then you can bring your chicks out into the light. But I don't want to see them. I shall act as I see fit. You're here for food for them? I'll help you."

The skipper joined Braden in getting at the passenger-space emergency foodstuffs. He helped get stores into the spidery maze of braces between the holds and skin. When Braden went back for the tape cameras, the skipper rumbled disgustedly again. When Braden returned, the skipper was gone.

He climbed back to the drive room, carrying as much of the food and water containers—plus one camera—as he could. He had to signal several times before the door opened and Fortescue peered out with a blaster in his hand. Diane was close beside him. The others were still in enthusiastic professional conference. Diane, alone, had heard the tiny rappings he'd made.

There was food and water. The camera was seized upon with comments of relief and approval. Hardy compared its data-plate with that of the vision screens. He was relieved. They were compatible. They would work together.

Duckworth went off by himself and thought profoundly. Once he bemoaned the lack of the script of the intended drama, "The Other Side of Nowhere." He craved that part of it concerning special effects and process shots fitting his current need. He demanded Braden's attention when he wanted details about the tradition of that fabulous ship-trap between the stars. Physical laws ran backward, eh? Normal matter was repelled instead of attracted? Time ran in reverse, too! Presumably entropy was reverse, too, and suns and stars grew hotter and hotter instead of losing heat to the hind-part-before emptiness between them. If there were galaxies, they hurtled toward each other instead of fleeing apart. Up was down, and left was right, and next Thursday was merely in one of the remaining directions and madness was a reasonable reaction to the phenomena described.

"But it's folklore!" protested Braden. "It doesn't make sense! There's no such place!"

Duckworth shook his head commiseratingly.

"No imagination," he mourned. "No imagination in all that stuff! Just a twisteroo system. Phooey!"

Time passed. There was no furniture. Braden slept on the floor when sleepy. He ate when he was hungry. The others labored with zest. The one camera was set up, and Hardy played absorbedly with stray objects representing unidentifiable other objects. Diane consulted with Duckworth and with Hardy, and performed intricate transpositions of lead-cables to the test-apparatus on the wall. Once she stopped and said with enthusiasm: "Sound! We haven't done anything with the sound!" And Hardy rose from the floor where he worked and clapped her on the back in congratulation.

More time passed. Fortescue and Derr Carmody were left out of the insanity that seemed to have seized upon Duckworth and Hardy and Diane. They talked dolefully together. After a time they became absorbed. Braden heard part of a discussion, once. They were planning a tape drama to be produced some time in the future, and it was magnificently theatrical and Derr Carmody had the star part and was standing on her right to dominate the scene when or if it was ever produced.

When Braden guessed that two days had passed, he went out of the drive room again. There seemed no change in the utter silence he encountered. He started to climb down after the other camera and the rest of the food cached near the bottom—the stern—of the ship.

He heard a faint and irrational thump. He froze. He heard another. He swung apelike among the slenderer beams and put his ear to the vast steel wall of one of the ship's holds. He heard more detailed noises. The mutineers were shifting cargo. They were hunting for an anonymous box which should hold some millions of credits in interstellar currency. It had been shipped among crates of preserved food and hardware and bottled drinks for a labor-force canteen. It was safer to ship valuables in this fashion than under special guard. The mutineers were completely confident in their possession of the ship. Confidence so great meant that either the skipper was dead, or they believed so.

Braden continued his downward journey. He burdened himself with the rest of the food and the remaining tape camera and got painfully back to the drive room with it. Duckworth gloated over the second camera. Diane tore herself away from the wholly unintelligible preparations being made, and talked with Braden. Her air was that of someone who had unconsciously been neglectful of a cherished friend, and now was trying to make it up.

"It looks," said Braden sourly, "like the mutineers are completely satisfied with themselves. They'll probably go on past the next checkpoint. Maybe they'll simply go on to Handel's Planet, to breakout, and then thread in another drive tape to take them from that point to where they intend to abandon ship. It's reasonable!"

And at that exact moment a warning din came out of a loud-speaker in the drive-room ceiling. A voice boomed:

"Attention! Breakout coming! Prepare to come out of overdrive in five seconds. Five . . . four . . . three . . . two . . . one—"

The universe seemed to reel and one's body and especially one's stomach seemed to try to turn inside out. There was an instant's intolerable dizziness.

"Turn on the test screens!" cried Duckworth, distressed. "Put everything on test to make sure! We should have been ready!"

Diane threw on one switch after another. The vision screens of the drive room lighted, showing exactly what the screens in the control room saw. A voice came out of the exterior reception speaker—again matching what was heard in the control room.

"Checkpoint Carol," said the voice from outside the ship. It was metallic and loud. *"Report. Report."* There was a pause. *"Checkpoint Carol. Report. Report."*

The voice was strong. This was another Space Patrol checkpoint at another crossroad of space. The Patrol ship on fixed post here could not be more than ten or eleven millions of miles away. It was next door! It was close at hand!

There was a banded sun in the right-hand vision screen. It filled a respectable part of the firmament. There were millions upon millions of stars in view. There was a planet to port. There were hummings, and whirrings, and no less than two distinct and wabbling whines which would be ship logs being broadcast for the Patrol ship to record and ultimately to be listened to absently by somebody not really heeding what he heard.

The *Rim Star*'s broadcast of its own log began. It was repeated on the test circuit as a high-pitched whine. Braden beat his fists together in sudden frustration. The *Rim Star* was out of overdrive in a checkpoint solar system, with law and order as maintained by the Space Patrol within arms' reach—only a few millions of miles away! But it could not be reached.

The strident whine of the *Rim Star*'s broadcast broke off with a savage clicking. A voice bellowed from the log-speaker and all the other exterior communicator speakers together.

"Call for help!" roared the skipper's voice. *"Mutiny!* Rim Star *calls for help! Passengers gone off in lifeboat. Skipper needs help immediately! Mutiny! Mutiny! Mutiny!"*

Braden plunged for the door of the drive compartment. But before he reached it the rasping crash of a blaster and then, instantly, the speakers made such an indescribable, raucous crackling sound that a cable or a microphone unit must have been struck and fused.

At the same time the stars moved on the test screens that repeated everything the screens in the control room showed. Millions of specks of light moved together. Some of them went off the screen. Others moved on. The rest changed to new positions. There was a click.

The *Rim Star's* observation units had recorded the bearing of the banded sun to starboard. They had quested for and found the pattern made by other remote and brilliant stars. They had swung the *Rim Star*'s blunt bow to a new bearing—the bearing of the destination to be headed for from this spot. The stars steadied.

There came the same booming voice again, but this time interrupted and crashing as if a blaster-bolt had melted a cable, yet its fused and re-solidified ends remained precariously in contact.

"Atten . . ." CRASH! *"Prepare"* CRASH!-CRASH!-CRASH! *"drive in fi-"* CRASH! Silence. CRASH! *"four . . . three . . ."* CRASH! *"one—"*

The universe reeled and seemed to turn inside out. There was the feeling of intolerable nausea and unbearable dizziness. There was the feeling of a horrible fall down a contracting spiral.

The ship was silent once more. The *Rim Star* was in overdrive again, headed at swiftly increasing multiples of light-speed for its destination still scores of light-years of distance away.

The people in the drive compartment stared at each other. The skipper had reported to all space the seizure of the *Rim Star.* Perhaps he'd hoped to hold the control room against attack until his message reached the Patrol ship, and was reported to its captain, and he'd given orders, and the Patrol Ship had started at maximum acceleration for the place from which the appeal had been broadcast, and until it found the *Rim Star,* and come alongside, and verified that there was fighting aboard, and then found an air lock and forced a way in and then—

The list of necessary events was a complete answer to hope. It couldn't have happened. The Patrol ship couldn't help unless help wasn't needed. In any case, the skipper didn't hold the control room uncontested. The blaster-shot was proof. The *Rim Star* was in overdrive again. Already she was farther from her position of report than the span of any known planetary system. She was momently increasing her speed. She was invisible, untraceable, and in a perfectly accurate sense nonexistent in the space in which Patrol ships swam.

Braden said fiercely: "Why did he do that? Why?"

VII

The universe went on about its businesses, which were many and extremely various. Nobody thought about the *Rim Star*—or anyhow very few. There were other and more important matters filling the minds of men.

For example, there was a shortage of available capital on Halli IV, so shrewd business men on Timbuk bought drafts on Klit, which were paid by drafts on Chagan, which were met out of funds on Tralee which could be transferred to Halli IV. And, therefore, an economic crisis was solved by the shifting of written numerals from this column to that on ruled paper pages, which juggling of numerals yielded admirable profits to the shrewd business men who arranged it.

There were other important matters. There were gigantic engineering projects moving parts of mountains on Lhassa III, and economic systems in process of change in the Nurmi Cluster worlds. There was a discovery of frozen, once-living organisms on Lithian VI, which was proof that in past ages the sun Lithian had been a brilliant star and life had begun even on its outermost planet, where now there were only frozen wastes of nitrogen snow. Expeditions were organizing with feverish haste to study the deep-frozen organisms *in situ*, to settle again the question of how life began, and why.

Orators made strident speeches, offering themselves for public offices. A sun with three occupied worlds, in Andromeda, began to show signs of instability, which meant that the planets would have to be evacuated. On a world in Cetis there was a collapse of public confidence, and the average index-price of sixty standard stocks dropped from a prosperous 698 to a catastrophic 473 and supposedly sane business men committed suicide in consequence.

And nobody thought of the *Rim Star*. Anyhow, next to nobody.

Of course, the people on Handel's Planet hoped that it might arrive. Things would be easier for them if that happened. They'd been brought to Handel's Planet in the mother-ships of drone fleets, and they'd been landed by spaceboat—at enormous cost in destruction—and the drones with supplies and equipment followed them down. They'd hacked out a clearing in the planet's jungles, and they wrestled with various local problems. They were not well-fed, and there was considerable danger. It was to be expected that several standard years must pass, and some hundreds of millions of credits expended before they could get the material for a landing grid aground and erect it, largely by hand. But then a reasonably comfortable life would begin, and colonists would come and settle down to a heavily mortgaged future.

If the *Rim Star* arrived and managed to land in one piece, though, the prospects for everybody would be brighter. Equipment needing years to land by rocket-driven drones could come down in the *Rim Star* on one journey. There was some doubt about it, to be sure. Rockets were not gentle propulsion-systems. Many drone ships made crash landings, and much equipment was lost.

And the *Rim Star* was to try to land on rockets. There was no other way. Even a spaceboat, coming to ground on Lawlor drive, created a hurricane of considerable proportions. A ship like the *Rim Star* would wreck hundreds of square leagues. So the big ship must balance herself down on jets of rocket-flame that would incinerate only forty or fifty acres. But it would be risky. So the few hundreds of people on Handel's Planet were not too optimistic.

If very few people off the ship thought of the *Rim Star*, those on board did not think at all about anybody else. Before the Checkpoint Carol incident, the steward and his followers may have dreamed fondly of riotous debauchery to follow the completed looting of the ship. But they must journey a long way yet to where it would be safe and simple to get to ground with their booty, while the *Rim Star* floated on, dead and a derelict forever. So they'd worked without haste in Hold Number Two. They took some mild pleasure in smashing shipping cases in the search—wasting what was needed by others. Eventually they would find a certain unmarked box that would make them all millionaires. Before the broadcast of "Mutiny!" they'd felt perfectly secure. It had been amusing, too, to think of the officers and passengers of the ship as cooped up hopelessly in a spaceboat which had no hope of touching ground again.

But now there'd been the happening in the control room, revealing the continued existence of at least the skipper. Everything was changed. One enemy aboard any spacecraft can destroy it if he is willing to go with it. The skipper was an enemy. Definitely. He was aboard. Definitely! They considered that he'd concealed himself nearly all the way between Checkpoint Alyx and Checkpoint Carol. He'd apparently vanished with the passengers, and supposedly in the lifeboat. But he'd actually been preparing some monstrous disaster for the *Rim Star*'s crew. What? He had to be found and killed!

Squabbling began among the mutineers. Each man, frantic, proposed a different, desperate, separate action. But there was only one result of action that would do any good. It would be the killing of the skipper. Immediately!

Braden's situation was changed, too. He was authorized to look after the passengers and ship according to his best judgment, while the skipper hunted mutineers. The authority was delegated to him, not transferred. He couldn't control the skipper. And while the skipper took such appalling chances, Braden could not take risks. The passengers couldn't handle the ship. For both the skipper and Braden to be killed would mean death for everybody else on board—except the mutineers.

Only the skipper felt confident that he knew exactly what to do. The skipper did it.

When the banded sun was merely a moderately bright star among others, the sound of a blaster went through the fabric of the ship. Braden heard the noise as carried by metal. The mutineers heard it in the same fashion. It meant that the skipper was taking some action which could only be intended for their hurt.

They went desperately to see what he'd done. They hoped to kill him. But they were not easy in their minds. Braden had scorched one man in the fire-fighting fog outside the control room. The skipper had burned another. And one more of their number—the chubby man with the insistently innocent face—had been near the control room when the skipper broadcast. It was his blaster-bolt that melted down the communicator cable. But the skipper had fired to better effect. Now the chubby man moaned from time to time, but they left him behind and went to hunt for the skipper. He'd had nearly a hundred hours in which to do them harm. They didn't know what he'd prepared, but they were jittery. And desperate.

The hunt for him in itself was hair-raising. Every collision door in the ship was shut, now, and the hull was divided into scores of separate air-tight compartments. Two of those were known to be empty of air and sealed off by necessity as the rest were sealed by precaution. The armed, fearful, desperate group of four mutineers—they had been six, and two of the active four were bandaged—had to search each sealed-off space or else submit to whatever the skipper should contrive for them.

They came to the first collision door. They went through it with weapons handy. That section of the ship was empty. They went through another door. Emptiness. Still another. Empty.

"He's hidin' somewhere," said the man with the battered face, profoundly. He referred to the skipper. "He won't fight."

"And if he does," rasped the steward, "it won't do him any good!"

He hoped it was true. But he wasn't sure.

They entered another compartment still. Everything was as it should be. They were becoming confident, now. There was no reason for it. But it is characteristic of the professional criminal, as of a gambler, that he can always believe that the laws of chance and probability, and even of cause and effect, don't really apply to him. He believes in runs of luck for him, but not in runs of luck against him. The men of the *Melpomene* passed through half a dozen compartments without discovering the skipper or any sign of his actions.

Then a man opened the collision door next ahead, and instantly there was a roar and a scream of air rushing into a vacuum. This was not one of the two compartments known to be in communication with empty space. It was another.

There was a frantic, horrified struggle by the mutineers to get the door shut again. They succeeded. Then they realized that air could be let out of the compartment in which they were. They didn't know how, but it could be done. They fled.

No space-crewman has anything but a pure horror of airlessness. It is the enemy of all life between the stars.

And, if a man has ever seen another after two minutes where there is no air—he is never careless again. Not in space!

It took them a long time to get back to the part of the the ship they'd been using. They fought to get through the doors first. But they got back to the corridor which began at the control room and went in turn past the skipper's cabin, the mate's, the crew's quarters and the galley. It branched, there, to reach the ship-door to Number Two hold. In pure terror of other air leaks the skipper might have contrived they'd fled to the place where they'd felt safe, before. Arrived, they realized that there was no safety there, either. But there was nowhere else to flee to.

The chubby man moaned from his blaster burns when they were back.

"Skipper was here," he told them despairingly. "He laughed!"

The steward went speechless. The chubby man panted his account. They'd been gone after the skipper for a long time when he appeared. He'd looked in and seen the chubby man on the floor. His eyes went over the mutineer without a change of expression, as if that member of the *Melpomene's* crew were an inanimate object. He went somewhere else. Presently he came back and went toward the control room. The chubby man heard him chuckle.

The steward went to find out what the skipper had done. He came back with his eyes like flames.

"We've got to find him," he said thickly. "Got to find him—"

He mouthed horrors, raging as a man can rage only when frustrated of the object of his rage. The skipper had gone to the spaceboat blister nearest the crew's quarters, and neatly and without violence he'd removed a certain small but absolutely essential part of the spaceboat's equipment. He'd made it impossible for the spaceboat to be launched. The safety devices wouldn't permit it with that one small object missing.

The crew of the *Melpomene* was imprisoned on the *Rim Star*. They might drive the big ship to any place in the galaxy. They could find and divide the treasure the ship carried. It was packed among the stock-in-trade of a canteen for workmen on a brand-new-colony world. But now they couldn't leave the ship without a landing grid letting them down to atmosphere and solid ground. And if a landing grid did lower them, they would be known immediately for what they were and what they'd done.

The steward realized the trap into which he'd led the others. The broadcast at Checkpoint Carol wasn't an attempt to get help. It had been a trick to make the mutineers resolve to hunt for him. The skipper'd fired a blaster through a collision door—emptying another compartment of air next to the two previously linked with emptiness—to make them come to that place. And in their absence he'd disabled a spaceboat. It was obvious that he'd disabled all other means of leaving the ship before doing that. No spaceboat could leave the *Rim Star*. It couldn't be launched. If launched, it couldn't drive. If afloat in emptiness, it couldn't hope to find a world to set down on.

The steward cursed thickly as he realized how completely his own plans had been countered. His followers looked at him numbly. They were in bad enough shape themselves. But he—

In the drive room, preparations for an attempt to recapture the ship were practically complete. The order of events was settled. What Braden planned to do, himself, he carefully glossed over. But he began to give instructions to Diane. They were painstaking, rule-of-thumb methods for directing the *Rim Star* to a yellow sun, and for opening communication with the human inhabitants of any planet that had land and seas and icecaps.

He was painstaking about the lessons, but he became concerned because he suspected her of saying, "Yes, I understand," when she was really thinking of something else. She denied it, and watched carefully as he drew diagrams in his notebook and wrote out the more important items. But she did seem to be thinking of something else. Eventually he called Hardy to listen to the instructions, too.

He was impatient. Up to now, it seemed to him, he had acted in an over-prudent, over-reflective, less-than-masculine fashion. What he planned to do would be violent and deadly, and he counted upon surprise and his own special talents to solve the otherwise doubtful parts of the program. But the chances that he would be killed were considerable. He was convinced that somehow he'd manage to stay alive until his part of the recapturing process was complete. But the passengers might have to take over then. The skipper's survival until needed couldn't be assumed.

"But why," asked Diane reasonably, "do you insist on telling us how to work the ship? You can do it!"

"It's a simple, ordinary, rational precaution," he insisted. "In the one chance in a thousand or a million—"

"There's the skipper," said Diane. Her eyes were at once frightened and soft, and she looked at Braden strangely. "Of course he's more anxious to kill the men who murdered his family than anything else. But—"

"I can understand that!" said Braden grimly. "That would be my first purpose if—"

But then he stopped. He went away. Yet within an hour he was explaining again to Hardy, and presently beckoned to Diane to come and listen, too. She obeyed. She watched him very gravely as he spoke. Her part, and Hardy's, was to be simple enough for experts in special theatrical effects. They'd stay in the drive room to do the things planned for them to do. Braden was not worried about that. But if anything happened to him—

Fortescue said abruptly, from beside the massive door: "Something's happened! I hear shouting!"

Braden unconsciously felt for his blaster. Without a word, he went out the door. His exit was completely silent.

Fortescue closed the door behind him without the slightest sound.

Braden stood for a moment on the walkway, listening.

A man shrieked. It was not a cry of pain, but of terror past imagining. It was high, and thin, and horrible, and the man who uttered it was in the surpassing fear and anguish one would expect of someone dangling over the deepest pit in hell and being lowered into it. He made sounds no more articulate than the squealing of a pig which knows it is going to be butchered. And because it was a human throat which made such inhuman sounds, Braden was ashamed for it.

He swung over the railing and began to swing down through that incredible, vaguely-lit blur of struts and joists and girders. The cry came from a definite direction, and there could be only certain causes for it. The most likely one was the skipper. Braden made for the source of the sound.

He came to a catwalk many levels below. He moved to the corridor plate which should be at its end. The cries died away, and Braden heard lesser sounds like sobbing. He opened the door plate to the corridor. There was utter and absolute blackness. There should not be such absolute absence of lights anywhere. But the door plate closed softly behind him, and Braden crouched in the abysmal dark. The man who'd been screaming only wept, now, but it was a bubbling and a whimpering and a gasping babble. The man only gathered breath for further cries of terror.

Braden moved toward the sound, with all possible caution. He held his blaster handy. He fumbled in his pocket and found a coin. Left-handed, he tossed it from him. It struck the metal of the corridor wall. The sobbing man was stricken to horror-filled, paralyzed stillness. And Braden heard the breathing of someone who was not the frightened one. It was a fat man's breathing. He waited, alert and listening as Braden was, but not conscious of the faint wheezing sound he lived with and had ceased to hear.

Braden said quietly: "Skipper?"

There came a chuckle from the blackness.

"Ah, Mr. Braden! Fancy meeting you here!" The skipper's voice rolled and rumbled. It was sardonic. "And how have you made out with your responsibility, Mr. Braden?"

"Fairly well, sir," said Braden grimly. "I've gotten ready to take decisive action, sir. But I wanted to make contact with you before starting."

He could tell where the skipper was. Against the side wall, but not standing up. He was sitting, with his back against the wall plating. Braden said abruptly:

"How badly are you hurt?"

The skipper growled as if in vexation.

"Now, how the devil—It's nothing serious, Mr. Braden. Nothing to interfere with what I propose to do. Our companion, Mr. Braden—the voice you heard singing—is one Sharkey, who considers himself an accomplished pirate. I fancy, at that, that he's the bravest of the lot. I caught him bound for the passengers' quarters, quite alone, doubtless hoping to find something there that he could steal and hide from his fellows. I took him by the throat from behind. He fought like the rat he is, but when he recovered consciousness he found himself bound and in the dark. I think," rumbled the skipper, with relish, "I think he believes himself in hell."

"He can hear you," said Braden, "and learn better."

The skipper rumbled once more, zestfully:

"Ah, yes! But he screamed most edifyingly when he thought he was in hell. Why shouldn't he be in even better voice, now he knows I will presently take him in hand to . . . ah . . . exact some payment for events aboard the *Melpomene?*"

"How badly are you hurt?" demanded Braden, again.

"Trivial," said the skipper. "I'm a heavy man, Mr. Braden. In the struggle with Sharkey, I tripped. His weight and mine came together on my ankle. It snapped—something did, at any rate. So I am immobilized, but I shall devote all my attention to Sharkey until his associates come and rescue him."

The unseen other man in the corridor began to whimper. It was a revolting sound. No man should ever utter such abject, hopeless, despairing whimperings.

"I still hope," said the skipper benignly, "that his friends will come to his rescue. In the dark all cats are gray, and everything that moves can be a target. I believe that in darkness like this I can come to a settlement with most of the crew I have reason to—be stern with. But you've come first. If you will go away, Mr. Braden, I feel sure that Sharkey will try much more urgently to persuade his friends to come and kill me."

"They've only to turn the lights on," said Braden grimly. "Then—"

"Ah!" said the skipper. "But they can't turn on the lights! I've blown the main ship circuits and I've smashed the emergency light systems. If the gentlemen of the *Melpomene* want to come at me, they must come on my terms. In the dark." Then the skipper said cheerfully, "I'll have him call them again."

The unseen other man in the darkness—Sharkey—screamed as the skipper made only a rustling movement. It was pure terror, perhaps made specific by knowledge both of past happenings on the *Melpomene* and intended happenings on the *Rim Star*. The mere idea that the skipper moved toward him was utterly terrifying. He shrieked.

There came a new sound. It was a hissing, crackling noise. It was entirely familiar. It was the noise made by loud-speaker units in every part of the ship when a general communication statement was to be made. There were voices behind the crackling sound. They said indefinite things. One voice said, *"No good."* Then the steward's voice boomed at full volume in all the halls and corridors of the *Rim Star*.

"Captain, sir," it said. There was a pause. *"Captain!"*

The skipper rumbled. The bound man ceased his shrieks to listen. Braden automatically felt for his blaster.

"Captain," said the steward's voice, smooth and unctious, *"you are making things bad all around. I'm going to give you a chance to stay alive. I am talking under a flag of truce. Listen carefully!"*

It was black where Braden and the skipper and the tied-up mutineer listened to the steward's voice. All over the whole ship the same voice boomed. It reverberated in the holds. It was intolerably loud in the drive compartment. It boomed hollowly in every section of the passageway from the abandoned passengers' quarters to the ship's control room. All through the ship, everywhere, the steward's voice echoed and re-echoed and resonantly reverberated between the curving metal walls.

"Listen, captain," said the voice persuasively, *"you know you haven't any help. You can't hope for any help. You're alone and you'll stay alone. But I'll make you a bargain. We're ready to leave the ship. Before we leave, we can let in space. We can make the ship an empty shell. And if we do that, you'll die here, all alone, and you'll stay alone for the next ten million years! But we'll make a deal!"*

"Mr. Braden," said the skipper sardonically, "you're about to hear an attempt to bribe me!"

The steward's voice came again, cajoling and somehow plausible.

Braden said: "Don't you think I should be offered something too, sir?"

The skipper growled. Braden felt along the corridor wall. He found a monitor box, containing instruments which reported to the control room temperature and air pressure and CO_2 content and innumerable other items about the conditions in this part of the ship. The steward had used such a monitor-box intercom when Braden was alone in the control room and the skipper was discovering that his bomb had been disarmed and his blast-rifles made away with.

"We can go away leaving the ship bled of air," said the steward, *"or we can leave you here with the ship all tight, and you can get to ground in her and be a hero, and you can have Sharkey—"*

The steward's voice proposed with a sort of deferential blandness that the skipper return the item he took from Lifeboat One and let the surviving mutineers go free with the money in hold Number Two. They'd made a repair to the lifeboat, he said suavely. They didn't have too much confidence in it. They'd rather have the original part. So to get that part he'd bargain—It was not even a reasonable offer, even had the skipper been alone against the mutineers upon the ship. It would surely not have been kept. But the steward offered it in a fashion at once obsequious and flattering and cajoling.

Then Braden said ironically into the intercom: "Steward, I have to be bribed, too! What do you offer me?"

There was silence. Braden's presence on the ship amounted to a shock. But then the steward's voice became bright and surprised and very admiring indeed. And it still came on the general communication speakers all over the ship.

"Mr. Braden!" he said warmly. *"You have surprised me! You're a very brilliant man, Mr. Braden! Very brilliant! I see I'll have to make a better bargain! Very well! Mr. Braden, I'll give you a million credits out of Number Two hold if you'll simply shoot the captain! A million credits! You can leave the ship with us, and no sign behind you, or you can take the* Rim Star *into port with a good story of how you recaptured her . . ."*

For a moment, Braden forgot that he stood in abysmal darkness, because the steward's voice was so plausible and deferential and respectfully admiring. He could see the steward, in his mind, as if in reality. The straw-colored hair, and the singular, apparently flabby skin on his face which wasn't flabby after all when one looked closely . . .

". . . Just one moment is all it will take you, Mr. Braden!" he was saying brightly. *"Just a pull of the trigger and you have a million credits! Think what you can do with a million credits, Mr. Braden! The girls . . ."*

Braden said disgustedly: "The devil!"

The skipper rumbled: "He's mad! Trying to get us to kill each other! The man's mad! He's possessed of a devil—"

"I think he is," said Braden coldly. "And I'm going to let that devil out of him with a blaster-bolt!"

Silence for the half of a second. Then the steward spoke again. And there was a quivering rage in his voice, now, that was literally demoniac.

"Come and try it, Mr. Braden! I'm in the control room. Come and kill me! Captain, you'll come! You'll come and I'll burn you down and you know it, but you'll come because . . ."

What followed was literally unbearable. Because the steward taunted the skipper. He began to tell the story of the taking of the *Melpomene.* He began with the officers dead and the passengers captives of the piratical crew. He began to tell in detail what the passengers suffered before they were murdered. He mentioned Sharkey. He mentioned the skipper's wife and daughter. The skipper began to move heavily in the darkness and the bound man began to shriek again in terror past description.

Braden moved through the darkness, blaster in hand, headed for the control room. He had to stop the recitation of enormities. It had to be stopped! He did not think coldly. He did not think clearly. He thought only of getting to the control room and killing the chattering, horribly boasting steward, thought there might be three blast-rifles waiting to burn him down as he came down the corridor to the control room door.

He heard indescribable sounds behind him. The skipper could not walk. But he was crawling to get at the man he had to kill, no matter if he had weapons beside which the skipper's pocket blaster was a toy.

VIII

Braden went through the first collision door and the loud-speaker in the compartment behind him ceased to be heard and the loud-speaker in the compartment he'd reached took up the unbearable narrative. He went on. Another collision door. There was no difference in the sound or the darkness. He went on and on. The steward boasted to the skipper. Behind Braden, the skipper crawled to kill or be killed. No man could hold himself back while such a narrative went on. Or after. The skipper crawled because he could not walk, and if he came to a section of the corridor where lights shone and blast-rifles waited, he would still crawl down that corridor into any imaginable fire. Because it would be better to be killed than to listen to the sufferings and the death of his wife and daughter.

Braden swore passionately while the voice went on stridently. Nowhere in the ship could the sound be avoided. One could stuff his ears and still hear it.

The ship's gravity cut off abruptly, and Braden found himself floating in mid-air. The boasting broke off. Then gravity came back. The maximum-emergency warning mooed dismally in every crevice and compartment of the ship. There were no lights, or Braden would have guessed that they went out and came on again.

He swore furiously. He was sure he knew what had happened. The boasts—the monstrous gloating over crimes in the past—were audible and unendurable in the drive room as well as the rest of the ship. Diane would have been aghast and sickened. She'd have stabbed blindly at something—anything—to create a diversion and stop the boastings. Perhaps she thought she could frighten the mutineers, at least temporarily. She'd know Braden could not bear it and the skipper couldn't live through it. Yes. She'd be trying to frighten the mutineers. But she was not doing it right!

The gravity changed again and Braden flung himself through the darkness. He crashed to the floor and found himself crawling. He came to the collision door he'd last passed through. He went through it again, hurrying away from the control room now. He went on backtracking. Since Diane had tried this ill-advised trick to stop the boasting, the situation had changed. It had worsened.

The point was that spacemen divide all phenomena into two distinct categories. Some things happen inside the ship. These things they feel, or hear, or smell, or see with their own bodies. But some things happen outside the ship. These things are reported by instruments. Spacemen believe their own senses about things within the ship. They believe, implicity, their instruments concerning things without it. The human eye is not adapted for observations in airlessness. So spacemen believe what vision screens tell them. The human ear is not adapted to pick up messages from ships in space and landing grids aground. So spacemen believe communicators. But anything they experience directly they consider to be within the ship.

The cutting-off of the ship's artificial gravity might not seem to be an external matter. Once surprise was past, the steward and his remaining followers might not be frightened by it—only astonished. It would not be inexplicable. An explanation could be that it was exactly what it really was—Diane or someone trying to stop the ghoulish narrative of the unspeakable. Braden swore.

He went through more collision doors. He heard the skipper, wheezing as he crawled. Braden snapped:

"Skipper! Find a wall plate and open it. We'll make better time!"

But he found one first, himself. He opened it. The dimmest of faintest yellow glowings came from the opening. The lights of the strut-maze were separately fused. The skipper had not blown them.

"This way!" said Braden impatiently.

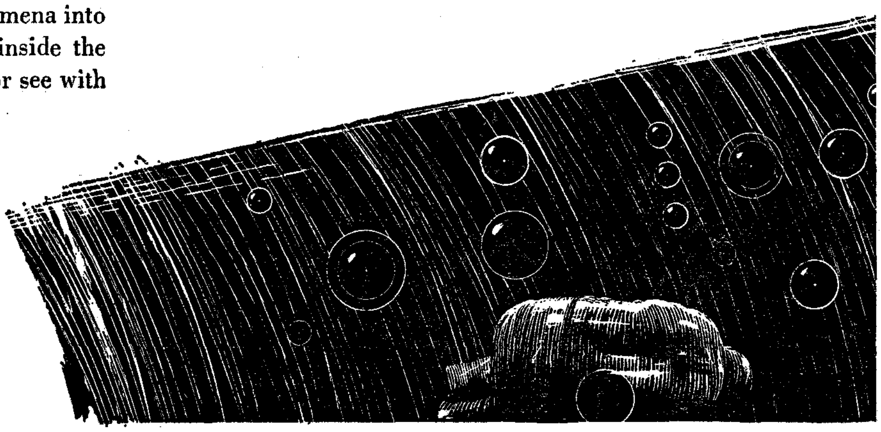
Gravity went off. Diane had started something. At least she continued it. The skipper panted:

"I'm coming! I'll kill . . . I'll kill—"

He reached the door plate and went through to the catwalk inside. He moved absurdly, having mass but no weight. Braden closed the plate and said urgently:

"Here, sir. Hold on!"

He began to climb, with the skipper holding fast to the back of his belt. It was extraordinary how he eeled through the confusion of braces and girders while rising and towing the skipper behind him. Once they were moving, they floated on. But Braden snatched at struts to twist past steel strength-members which should have stopped them. It was not necessary to use strength to continue their ascent, but it was exhausting to push and snatch and thrust to make that ascent possible.



He caught at a catwalk and checked their rising. He swung over its rail—with a remarkable awkwardness because of the lack of gravity—and pulled the skipper after him.

"The control room's higher," puffed the skipper. "We've a way to go yet!"

"We're going to the drive room," snapped Braden.

There had been no boasting for minutes. Then, without warning, the universe reeled. There was the sensation of a spinning fall, and an enormous vertigo, and one seemed to topple head-over-heels in a contracting spiral. A voice boomed through all the multiple echoings of the space between the cargo holds.

"Nuw . . . oot . . . eerth . . . rohf," said the voice authoritatively. It added more nonsense syllables. *"Vyff . . . ni . . . gnimuc—"*

Still more meaningless sounds. Then there was stillness. Gravity was back. Everything seemed normal, but the voice was unbelievable!

Braden rapped on the drive room door. He rapped again in the code he'd arranged with Diane and Fortescue. Fortescue opened the door, thrusting a blaster-muzzle through the crack at the beginning, before he peered.

"If I'd been a crewman," said Braden coldly, "I'd have made that blow up in your hand! Come in, skipper."

Diane looked infinitely relieved at the sight of Braden. She said quickly:

"Please tell us what to do next! We . . . we had to do something to stop him from those horrors! So we turned off the gravity. We'd set the warning tape to run backwards before. And then breakout came—"

"What else have you done?" demanded Braden. Battle with pocket blasters against heavy-duty rifles would be a massacre.

He went to the array of instruments Diane and Hardy had been rearranging, with suggestions from Duckworth to add to their own ideas. He stared at the vision plates. He did not believe his eyes.

The screens, faithfully repeating what showed on the screens in the ship's control room, displayed stars. But they shone by dozens instead of myriads. The brightest of them was a red star, writhing as if in anguish, casting out masses of its own substance to fall back and glimmer more brilliantly at the point of impact. There was a purple star, which grew visibly brighter, and visibly dimmed, and visibly brightened again. But the tempo of the changes was presposterous. There were vague, misty patches of brightness between the star-images. They would be nebulae—galaxies hundreds of thousands or millions of light-years distant. But this was not the galaxy in which humans lived and traveled and colonized the worlds. There was no Milky Way. None of the six screens showing space outside the ship revealed any trace of that band of light created by thousands of millions of suns. This was a new universe. A strange universe. This was—

Braden was shaken by the sight. He was a spaceman. It is necessary for a spaceman to believe what his instruments tell him. Astrogation is impossible without that belief. So Braden stared blankly. At Checkpoint Carol the vision screens had shown the universe as made of stars. They glowed in unthinkable numbers and in every tint and shade the eye could perceive. There was the Milky Way—a vast band of light. Now—

There were only dozens of stars, of which one was a writhing red giant of wholly unfamiliar type, and another a purple star which varied impossibly, in periods of minutes instead of days or months. On the firm evidence of the vision screens, the *Rim Star* had not only ceased to be in that part of the First Galaxy known to humans, she was no longer in the First Galaxy at all. It was a new and midget galaxy of few stars and none of familiar types. The stars on the screens made the most appalling sight that any man had ever seen on the screens of a spaceship control room.

"Is it convincing?" asked Diane anxiously. "Does it look like the real thing?"

Then Braden realized, but still it was not easy to believe. These were not real stars. This was not a real report from the *Rim Star*'s scanners outside the hull. This was a tape-drama universe, a special effect intended for tape and presented as reality. Actually, outside the ship a perfectly normal galaxy existed. Very probably the sun of Handel's Planet lay a not unreasonable distance away. But in the control room the information about the ship's surroundings was—this.

"If I didn't know," said Braden slowly, "I'd swear the ship had broken out of the closed universe we know and somehow had gotten into another universe altogether."

The skipper glared at the images on the screens.

"Ah-h-h!" he rumbled, in deepest satisfaction. "They'll never get back! Never!"

"I suspect they think so, too," said Braden. "And so long as they don't suspect the instruments of lying to them—"

Hardy said diffidently:

"There's a communicator we haven't tried. It's not part of the monitor-intercom system. I think it's for use when the drive and astrogation equipment's checked, in port. I've already cut off the microphone. I think we can hear what goes on in the control room without their hearing us here."

"Try it," said Braden.

Hardy threw a switch. For a moment there was no sound. Then a racked voice whimpered:

"What is it? Where are we?"

A second voice said in a shocked, incredulous tone:

"There's no Milky Way!"

A third voice cursed shrilly. Horribly. Hardy threw off the switch.

"No comment from the steward," said Braden grimly. "He's busy thinking. He'll try something! But we've got to make sure he doesn't find out—"

"Here—" said Diane rather breathlessly, "here are the other effects we've got ready."

She showed him how apparently valid illusions were produced for vision screens—whether in homes or as now on shipboard. The trick was extraordinarily simple and remarkably ingenious. Braden would never have imagined any part of it. It was his instinct to deal always and only in realities. It was the habit of a tape-drama special-effects specialist to concentrate on making things appear to be realities. It was not easy for Braden to grasp the idea of not doing things, but only seeming to do them. In the end he had practically to take on faith Diane's assurance that the miniature panorama he saw appeared on the ship's screens as the entire new universe they displayed.

A relay clicked somewhere. Something moved in the drive room. The stars on the vision screens stirred and moved.

"He's turning the ship around," said Braden grimly. "To see if she can retrace her route into whatever he thinks this is, and so get out again. I hope you've arranged so he can't."

The skipper rumbled triumphantly:

"It's the Other Side of Nowhere! That's where we are! And the steward's not gloating now over the *Melpomene!* He's got something else to think about! He'll never get out of this!"

Diane looked at him in astonishment. She didn't realize how completely a spaceman believes his instruments. The skipper had heard a fragment or two of what she'd told Braden, but he believed the instruments. He'd lived by that faith for more than half his life.

The shifting stars steadied. Those that had been on the bow screen were now on the stern. A relay clicked. The *Rim Star* went into overdrive. It was unpleasant.

"I think," said Braden very coldly, "I think you made more than a diversion, Diane! I'd call this a weapon. What will the next breakout show?"

Hesitantly, she showed him another miniature panorama. She explained what it would look like on the screen. He shook his head.

"It's appropriate," he objected. "It makes sense with the first one. But we can't have that! What we need is to make them think they're in a universe of madness, in which sanity has no place, where brains offer no hope, and reason doesn't apply to anything!"

Duckworth said hopefully:

"I figured the fundamental law would be that no cause ever produces the same effect twice."

"That's about what we want," agreed Braden. "The crewmen have a purpose, for now and as long as they believe they're out of normal space and time. They'll want to get back to the universe they know. That's next in importance to them now, after breathing! But if nature seems never to repeat itself—if they find their brains useless and their needs multiplied and that reason doesn't apply to wherever they think they are—"

Diane showed him another miniature set, and another and another. He began to see what special-effects techniques could do. His expression became forbiddingly resolved. Then Diane said, her forehead wrinkled:

"It's going to be—cruel, the way you intend to work things. But we could offer to stop if they'll give up."

"No," said Braden. "If they thought we could stop what they see, it would have no effect. You heard what they boasted!"

Diane painstakingly arranged the next special-effects arrangement so the screens would show it when the *Rim Star* went back to normal space—to make it look abnormal.

For a very long time nothing happened. Braden grew restless. He had Hardy turn on the communicator once intended for liaison between specialists checking the ship's drive and the control room. There was terror among the mutineers. The sharp-eyed man shivered and demanded when the steward would break out of overdrive again. The steward insisted that they couldn't know when the ship had left normal space for the—the cosmos in which it had emerged. They must travel a long time to be sure of passing the threshold of normal space in the opposite direction.

It was a convincing argument—for a time. But the *Rim Star* drove and drove and drove. Nothing came to it through the surrounding overdrive field. No light. No radiation. Not even those strange sweet short-wave sounds that communicators pick up occasionally and for which there is no explanation whatever.

It was hours before the man with the battered face, in the control room, thought of a frightening possibility. The ship had been in that legendary Other Side of Nowhere, which was a universe in which all the laws of nature ran backward. But it was said to touch normal space only in one small area. Ships by dozens blundered into it—at least there were many ships which had vanished without trace in past centuries—and no more than one or two had blundered out. But they had blundered out at once. It was like a doorway. Only at some one point was passage between the universe possible. Maybe the *Rim Star* would go past that doorway, that opening between the universe of men and ships and colonies and the insane cosmos of Nowhere. The *Rim Star* might now be past that place where passage was possible! She might be going farther and farther from it every instant . . .

The argument grew shrill in the control room. The steward was shaken. He was more intelligent than his followers. He could think of more terrifying things than they could imagine. Already he was desperately convinced that they'd never get back to normal space and normal stars again. But he was afraid to admit it even to himself.

It was a full day after the breakout into the midget galaxy that he yielded. He pressed the breakout stud.

Breakout came. And as the nausea and sensation of dizzy fall ended, a voice said from speakers all over the ship:

"*Nuw- ott . . . eerth . . . rohf . . . vuff . . .*" Then confused syllables and the relatively sane compound, "*Gnimuc,*" and then more nonsense.

The man with sharp eyes cried shrilly:

"*Hear that? It came after breakout! After! And it was backward! Nuw is one, and oot is two and eerth is three . . .*" He yammered. "*T-time's going backwards! Back—*"

Then there was a sudden stricken silence. And those in the drive room knew what the mutineers saw.

There were stars, but they were brighter than the stars of any cluster in the First Galaxy. They burned terribly. They were white dwarfs, and they were innumerable. They were as bright as the white dwarf star in the Crab Nebula, whose surface temperature is computed to be half a million degrees Kelvin, and which will vaporize any object of mere stone or metal at four hundred million miles.

In the drive room, Braden spoke to Diane in a low tone. There was no need to be quiet, but he almost whispered it. And Diane led the way to those duplicates of the plate monitors which reported to the control room—and no less to the room of the drive and astrogator—the temperature of every outside plate of the *Rim Star*'s gigantic hull.

Braden began briskly to adjust them.

There was silence in the control room. But presently an alarm sounded. There were babblings. Then the steward himself discovered the situation of which the alarm had given warning.

Every plate on the *Rim Star*'s ungainly exterior reported itself to be already at a temperature amounting to low red heat. The temperatures rose and rose. The instruments said, in fact, that the ship might melt herself down from the heat of the white dwarfs if she didn't leave immediately. On overdrive.

The men in the control room believed the instruments. The *Rim Star* went into overdrive with panic-stricken haste.

There were more babblings in the control room. They approached hysteria, now. The *Rim Star* drove, and drove, and drove. But in time it came out again. It was many hours later, but it had to come out. Those in the drive room could not endure the blackness and the isolation of the ship. Which was understandable enough. A ship in overdrive but bound from one place for a known destination—it is isolated like the *Rim Star*. Its crew cannot look out and it can receive no signal. It is blind and deaf so far as the rest of its cosmos is concerned.

But its crew knows where they are going! They can compute, if they choose, approximately where they are.

The mutineers of the *Rim Star*, had no such consolation. They did not know where they were. They did believe that they were in the Other Side of Nowhere, but that was not a position. It was a disaster. It appeared that they were lost beyond the imagining of hope. There was nothing to do. There was literally no place to go. Yet they could not stay in overdrive. They had to search, desperately, for what they were already certain they could never find—a place where reason applied to reality, and the skies were sane.

On the third day of their blind journeying, the *Rim Star* came out of overdrive twice. In the first emergence the mutineers found themselves—the vision screens showed it all very clearly—at the edge of an enormous, luminous, vaporous cloud of shining gas. It filled parsecs of space. Some stars shone through the mistiness, but outside it there was only darkness save for infinitely remote island universes the *Rim Star* could not reach even in centuries of overdrive. This was not their home galaxy. Therefore, it had nothing for them. They did not know where they were. They were reduced to weeping, now. They did not quarrel. They were sunk too deep in despair.

They returned the *Rim Star* to overdrive. More long hours went by and the isolation and the silence built up and up and up. There was nowhere to go! They were in an alien cosmos. They were imprisoned more terribly in a vaster prison than humans had ever been before. There could be no rescue. There could be no hope. The treasure for which they had so zestfully planned this piracy—it had no value in a universe where there was no one but themselves. They wanted terribly for there to be others than themselves.

But they literally did not think of Braden or the skipper. They stayed in the control room, to look at the screens when the steward broke the *Rim Star* out of overdrive. On the third day they came out of overdrive one more time. In some ways this was more horrifying than anything that had gone before.

They felt the dizziness and the nerve-racking spiral fall. Nausea wrenched at their vitals. It ended, and they were no longer in overdrive. But they saw nothing. Outside the ship—so the vision screen said—there was nothing to see. No suns. No stars. Not even unapproachable galaxies, no matter how remote. It appeared that the *Rim Star* had found a place in the Other Side of Nowhere, where there was nothing. Nothing! Creation had not yet begun. Even the steward whimpered as they fled from that place.

The *Rim Star* stayed in overdrive for a terribly long time after that experience, which was literally of nothing at all. Perhaps the mutineers guessed wildly that they might break out again and find something worse than nothing. Perhaps they tried to imagine it.

But it was impossible not to try to hope. So they tried, and stars glittered in the vision plates, and a yellow sun burned fiercely in midspace, and they saw a small green world to port. It was a beautiful world. There were broad seas and green-covered continents, and there were icecaps and cloud masses. There was a glamour over it. They looked at it longingly. Their longings had become quite primitive, these past few days. Very primitive!

Those in the drive room heard the mutineers speaking brokenly as they drove the ship for the small green planet. This was the fourth day after the beginning of their doom. They talked in snatches, half-incoherently. They watched the green world seem to approach. Their eyes hungered as they looked at it.

But it ceased to draw nearer. The *Rim Star* came to a stop. The Lawlor drive functioned perfectly. Everything was right. But they did not get any nearer to the planet they now craved to land on and to touch. The vision screens showed the world as luring and warmed by sunshine and washed by showers and covered with growing things. But it would not let them land. It thrust the *Rim Star* back. It repulsed it.

Those in the drive room heard the steward explain, dully, why they could not ever reach it.

"It's got reverse time," he said almost apathetically, "and all the laws of nature run backward here. So it's got reverse gravity. Instead of drawing the ship to it, it pushes it away. And—and if we did get to it—it's anti-matter. It's got electrons in the nuclei of its atoms, and positrons where electrons ought to be. If the *Rim Star* touched its air, those contra-atoms would combine with the atoms of the ship. They'd cancel each other out. There'd be a blast of every atom of the ship breaking down to pure raw energy. It'd be an atomic explosion like men have never made. We can't land . . ."

He threw the ship into overdrive so he couldn't look, any longer, at the world he longed for but could not possibly—not conceivably!—touch ground on.

The mutineers were in a very bad state, now. They no longer talked coherently. Presently they had spent five days in ever-increasingly complete conviction that they were gone from the universe in which they had been born. Every value they'd known was overthrown. Brains were futile and reason inapplicable and sanity had no place in their society.

Fortescue came unhappily to Braden.

"Look!" he said uneasily. "The mutineers . . . they're about to crack up. Are they dangerous now? Can't we just—"

"Just what?" asked Braden grimly. "Make a deal with them? Do you realize that we've nothing to offer them but assurance that they aren't really in a universe gone mad? And if they're assured of that—"

"But what we're doing to them is pretty—ruthless."

"I have a responsibility," said Braden. "To the ship, to the skipper, and to you passengers. I have to be ruthless because the mutineers won't let me be anything else. How considerate do you think they'd be if I told them consolingly that there wasn't really any reason for them to be nerve-racked and despairing? Now, they wouldn't believe me unless I proved it. And if I did—how long would they be nerve-racked? How long before they avenged themselves for having been fooled into despair? How long would you live?"

Fortescue said wryly: "You're right. I suppose I complained so I'd feel I could wash my hands of it."

"Go talk to the skipper," said Braden sourly. "He's realized what's going on, but it took him days to believe it. Now he's not pleased because we've made their instruments lie to the crewmen. The skipper would prefer that they say the same things, but that they'd be true. He'd be happier if the ship were actually in the mess the crewmen believe—and he right in that mess with them!"

Braden paused, and added: "I'm getting ready for the last trick of all, now, and it's definitely the most ruthless. I'd much rather fight them with knives or blasters. I feel ashamed at contriving tricks instead of fighting them fairly. But what else can I do?"

There was nothing else to be done. The terror of the mutineers was the only possible weapon against them. The crewmen were better and more heavily armed, and if they suspected that their terror was contrived, they'd kill with no faintest thought of mercy. So—

The ship stayed in overdrive. Four hours. Eight. Twelve. Twenty. Braden had his preparations made. They were remarkably simple. They consisted solely of turning off the vision-screen circuits so the screens would show no images at all, and fixing a spring in the overdrive relay so that once the ship came out of overdrive, it wouldn't go back in again. And he disabled the relay for the Lawlor drive. That was all. He explained it to Diane. She listened gravely.

They waited.

Nearly thirty hours after the green world vanished from the vision screens, the mutineers cut overdrive once more. There was no warning except the invariably appalling sequence of sensations. Then a taped voice—run backward—said, "*Nuw . . . oot . . . eerth . . . rohf . . . vyff—*" and the rest of the syllables that a countdown to breakout sounded like when run backward.

The overdrive field was off. That was all.

No images formed on the vision screens. No radiation came into the ship's communicators. It was a repetition of what had been the most horrifying of the special effects so far displayed as realities. But it was the simplest. It was simply nothing at all. In the control room the feeling was that for the second time the *Rim Star* had moved beyond the confines of normal and abnormal space, together. That it was beyond all space. It was beyond all created things. It was more remote than any other object in however many other universes there might be. Nothing existed here. Nothing. No star or sun shone. No light from the primal eight-billion-year old cataclysm of creation had reached the spot to which the *Rim Star* had traveled.

So it seemed. It was horrifying beyond compare. The *Rim Star* might travel forever and never come to where a single ray of light had ever passed. No suns, stars, worlds, galaxies—Nothing! It was unbearable to think of and worse to experience. Even the steward whimpered as he pressed the button for overdrive.

Nothing happened.

Nothing.

The steward gasped. Absurdly, he pressed the Lawlor-drive stud. It would be useless even between stars. Here it would be ridiculous to use the Lawlor drive. Creation had not yet begun, here!

Again nothing happened.

There were gibberings. This was the end. From now on, nothing could happen. It was not even possible to try to make anything happen. Nothing could.

The steward, quite suddenly, behaved as if hysterical. He threw on the overdrive, and it still did not work, and the Lawlor, and it did not work. With a sort of frenzy he flung himself about the control room, trying to make something happen.

He fired the emergency rockets. The firing could serve no possible purpose, but he fired them. At least the vision screens should show their flames, where never light had been before!

But they didn't. They showed nothing. And the steward and his followers could only imagine one reason. It was that here there was not even space, in the sense of something by which gravitation reaches across distance and light travels and in which the worlds and comets and meteor-streams swim. There was *nothing* outside the ship. The vision screens said firmly that there was nothing by which the flame of the rockets could send light to the outside scanners. Nothing . . .

In the drive room, Braden's expression was utterly grim and completely implacable. The crewmen of the *Rim Star*—who before had been crewmen of the *Melpomene*—could not be reassured. If they were reassured, they would become murderous. It was not possible to be merciful to them.

He waited a full half-hour after the rockets were fired. There was then no motion or sound in the control room. Then something happened. One small green light in a wall panel of hundreds of small green lights went out. It was a light from a monitor unit somewhere in the *Rim Star*'s huge hull. Glowing a cheerful green, it reported that at one special spot the temperature, air pressure, CO_2 content and humidity were within allowable limits. If any of the items went wrong, the green light would go out and a red glow take its place. Simultaneously, an alarm would ring to call attention to the fact that something was going wrong.

Such an alarm had rung when—a long time ago, now—Braden punctured the personnel-lock door to let the air of two compartments go squealing out to empty space.

But now, a green light went out, and that was all. The red light did not come on. The alarm did not ring. But one green light was gone. It was as if that monitoring station had ceased to be. It was far, far away from the control room. It was at the very stern of the ship.

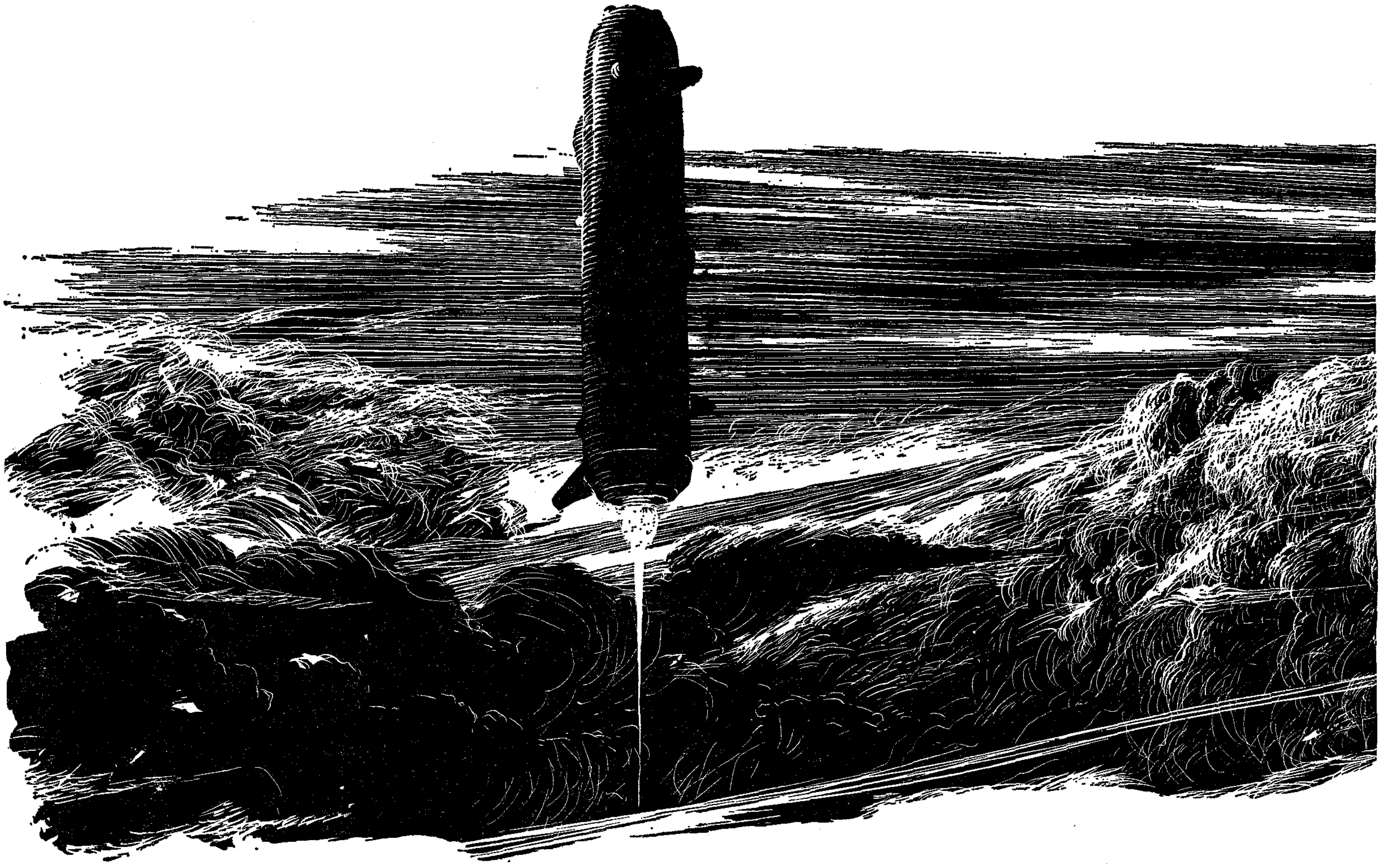
A little later, another green light went out. No red light. No alarm. Just—a green light gone. Near the stern of the ship.

Later again, still another. Very near the first two. Near the stern.

More than twenty of the lights had gone out—but no red light had come on—before the fact was noted. The steward saw it. He sat numbly savoring despair. It was an acute, a painful, an anguished sensation.

He saw a green light go out. Then he saw that others had gone out. Each green light was assurance that all was well at some one spot in the *Rim Star*. When all was not well, a red light should glow. But green lights were out, and red lights were not on. A certain area of the *Rim Star* was—its instruments asserted—as if it had ceased to exist. It no longer reported, good or bad. So it was gone.

The steward stared. The ship's vision screens said there was nothing outside the ship. Light from the ship's own rockets did not travel—there was nothing through which to travel—to the scanners on the ship's hull. The overdrive field could not operate. It could not stress the space outside the *Rim Star*. The instruments said that there was no space outside the *Rim Star*. Even the Lawlor drive did



not operate, futile as that would have been. Now lights went out, one by one, sometimes two by two. An increasing area at the stern of the ship seemed—so the instruments said—to have ceased to be. That area increased as more lights ceased to glow.

The steward stared, paralyzed. He couldn't go to see what was happening. The skipper had disabled all the corridor lights. There were lifeboats, but they were disabled. They could not be launched. There was a Lawlor drive, but it could not be used. There was overdrive, but it did not function.

The steward made noises in his throat. He was a spaceman. He believed what instruments told him. A third of the green lights were out. They did not go out rapidly. Their extinction was slow. It was even tediously deliberate. But in half an hour from the beginning, half of all the green lights were out.

The other crewmen knew about it, then. They stared at the monitor board, and the lights went out one by one and two by two, and more than half of the ship reported—by not reporting—that it had ceased to exist. And very, very deliberately, that nothingness as reported crept up and flowed up and inched up. There came a time when two-thirds of the huge *Rim Star* did not report anything at all to the control room.

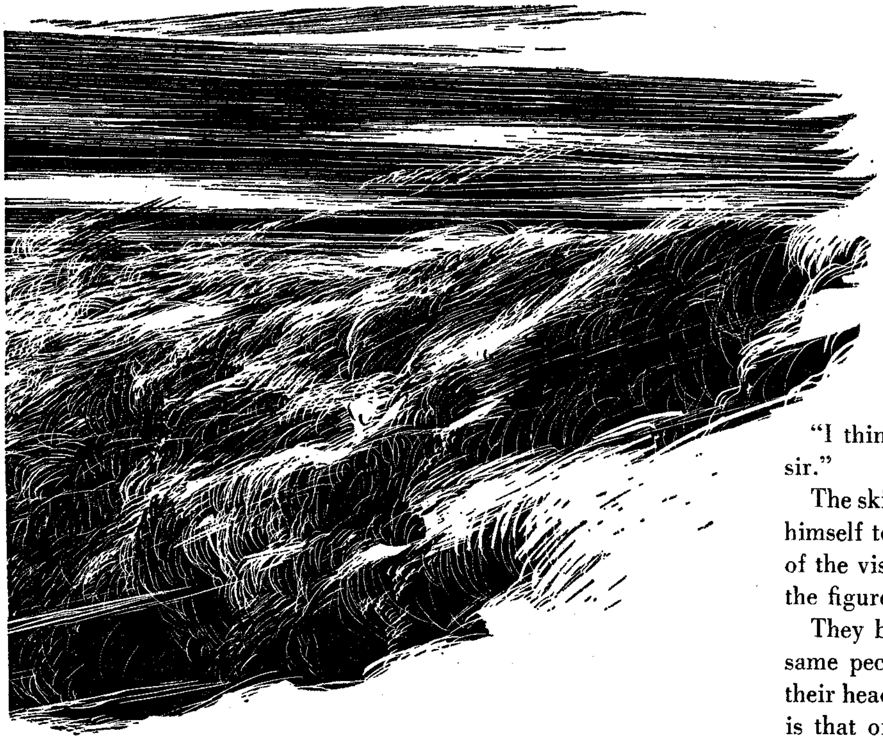
The sharp-eyed man breathed in gasps as he watched. He did nothing about the vanishing lights, of course. There wasn't anything to do. The man with the battered face whimpered as the green lights disappeared. The fourth man wept, watching with streaming eyes as the lighted area grew less and less. The steward swallowed. Suddenly he spoke in a loud voice. He assured his three followers that it was nothing at all. He explained that it was—it was—it was—. His voice stopped with a click in his throat. He wrung his hands.

Green lights continued to go out. Three-fourths were gone. Seven-eighths. The men in the control room watched. Nine-tenths. The lights representing the area just outside the control room were last. There were none left except those. There were five of them. Four. Three. Two. One—

There was a very great silence in the control room of the *Rim Star*.

IX

Braden was the first to enter the control room. He held a blaster ready, but it did not appear that he expected to use it. He didn't. Actually, after a single glance around, he put it in his pocket. He gathered up the weapons the crewmen had had ready for some unguessable event.



The last time there'd been a thought of using them, of course, was more than five days ago, when the steward tried to bring the skipper to be killed, by his recitation of the taking of the *Melpomene.*

"It's all right," said Braden to the air in the control room. His voice would go down to the armored compartment where the drive and astrogation units were established. "Everything's all right."

There was no answer, because the microphone in the drive room was cut off, leaving only one-way communication.

Braden examined the crewmen. He looked uncomfortable.

The skipper came crawling into the control room. His eyes blazed because of this final nearness to those who had injured him. Braden said, dry-throated:

"You're too late, sir. They won't resist anything you want to do, but I don't think you can do anything. There's nothing to do! They're . . . finished."

The skipper crawled implacably to the motionless steward. It was grotesque to see so huge a man crawling painfully on the floor. He did not seem to hear Braden, but when he reached the steward, he stopped. And Braden knew the state he was in. Braden had known that state when he first realized Diane's danger from the mutineers. It was rage so terrible and fury so vast that it ceased to be either rage or fury. It was an unnatural cold calm in which mercy was not even an abstract idea, but something wholly inconceivable.

The skipper stared. His nostrils distended. He breathed heavily. His features were set and composed.

"I think," said Braden, "that you should be satisfied, sir."

The skipper moved away from the still figure. He pulled himself to his one sound foot. There was motion on one of the vision screens. He glanced at it, and then back to the figures on the floor.

They breathed. That was all. They lay still, all in the same peculiar position, with their knees drawn up and their heads bent forward. It was the foetal position, which is that of a child before it is born, and that of a man who finds it unbearable to have been born, so that he goes into absolute retreat from the fact of being, itself. These men could not bear to be. They could not bear to think, or feel, or know. They would never again think or feel or know anything. But they were not dead. They simply were not.

A vision-screen image formed. It was that of the universe of stars. They were not strange. They were innumerable. There was the Milky Way. It shone.

"Ah, yes!" said the skipper with a terrifying composure. "This is what you explained would happen. I did not quite believe it. But it has happened. If it is final—"

"I'm afraid it is, sir," said Braden. "They don't want to exist. They don't want to think or feel or know. They've spent almost a week in what they believed a cosmos in which every thought and imagined action was frustrated in advance. They couldn't take it. Nobody could! So they went into what I believe is called catatonic withdrawal, sir. It's not common, but it's well enough known."

The skipper hitched himself laboriously to the upholstered control-board chair. He let himself down into it and regarded the unconscious mutineers with distended nostrils and absolute ferocity in his eyes.

"You may call your passengers up, Mr. Braden," he said in the same unnatural calm. "They can attend to these—" He stopped. "We will find out just where we are when the vision screens are back to normal."

"I told Hardy to restore everything to standard working order, sir. It should take only a few minutes more."

The skipper again eyed the motionless crewmen. He said in a stately fashion:

"Suppose you make your report for the log, Mr. Braden. Will you throw the switch, please?"

Two vision screens showed stars by thousands of myriads, now. The circuits to make the instruments untruthful had had to be made. That took time. But it was simple to cut them off and restore the original state of things. Braden threw the log-switch.

"I suppose, sir, you will cover the mutiny itself. But so far as what I did is concerned—I got the passengers into the drive room, which I thought the mutineers unlikely to suspect. There was a great deal of equipment there, sir. The passengers said it was nearly the same as for a laboratory for special effects on picture tape. With two cameras they could do a great deal. With that equipment in addition they could do anything. And they seemed to, sir."

Braden paused.

"They considered," he said, "that people watching a broadcast screen know it's make-believe. When they go to a theatre they know the same. But men on a ship like this, sir, are conditioned to accept what instruments tell them. They can't imagine that an instrument can lie. So when we controlled the screens and the loud-speakers and the drive and all the rest, and at the very end turned off the monitor lights one by one, sir . . . why . . . they believed they were in the Other Side of Nowhere. And they couldn't take it, as I said before."

"I see," said the skipper in stony composure. "And to make a formal statement of the purpose of this mystification?"

"Why, sir, the steward had suggested it, though unconsciously. He talked to me about it, at considerable length. At the moment he was making conversation until he could see a chance to murder me, sir, but he almost believed it then. When he experienced the Other Side of Nowhere, sir, he was a pushover."

"Ah!" said the skipper deliberately. "But you didn't think the deception would produce the effect it did, did you?"

"I wasn't sure, sir."

"You only hoped," said the skipper impassively, "that they'd become agitated enough to let you, only one man with a hand blaster for armament, recapture the ship against several men armed with heavy-duty blast-rifles."

"Yes, sir," admitted Braden. "That was my first intention. I think I was right. I think I could have done it."

"But this is a report for the ship's log, Mr. Braden!" The skipper was severe. "In effect you did recapture the ship. You did very well. And in capturing these criminals relatively unharmed, you acted in a manner deserving high praise."

Braden stared. He wouldn't have called the prisoners relatively unharmed. But the skipper went on with grim precision:

"I would not have arranged things this way, Mr. Braden. But I am more than content. I would not have dreamed of so satisfying an event." He paused. "It has been a source of great bitterness to me, Mr. Braden, that no matter how slowly or how painfully I might kill these men, when or if I ever came upon them—once they were dead and in hell they could remember and gloat over their crimes against my wife and daughter. But that is ended. They are unconscious. You assure me that it is unlikely they will ever be conscious again. In a sense they are destroyed as death does not often destroy anyone. And—I think I shall sleep more soundly, Mr. Braden, because they can never even remember what they were destroyed for."

There were sounds. Duckworth and Diane and Fortescue appeared. Duckworth was still worried and uneasy. Diane looked infinitely relieved. The skipper nodded to them.

"I shall find out where the ship is," he told them, "and immediately get on course for Handel's Planet. I will ask you"—his eyes singled out Fortescue and Duckworth—"to get rid of these men on the floor. If they stir, you can take measures. But it is not likely."

Braden recognized the acid irony.

"I fear," said the skipper, "that two other crewmen are not so fortunate. One was badly burned. He has had no attention for days. It probably did not occur to his companions. It was not practical for us. As for Sharkey . . . ah . . . I believe he died of fright just before I left him."

Braden stirred uneasily. He didn't believe it. But it would be absurd to question it.

Four vision screens now showed images of perfectly normal space, with the Milky Way prominent across two of them. Within minutes, the last two lighted up. The skipper looked at them. They showed the universe—the real universe—the First Galaxy. He rumbled.

"Make the necessary observations, Mr. Braden, and head for our proper destination. We will put the passengers aground by spaceboat. We cannot land, of course. Our rockets have been fired. I heard and felt the occasion. We will land the passengers and take the ship to where we can replenish her rockets. I say this to complete the record in the log."

He threw off the log-switch. The impression of irony was extreme. He stood up.

"I trust to your astrogation. Mr. Braden. Take the ship."

He hobbled painfully to his quarters.

There were things to be done. Many things. But eventually Braden was jockeying the *Rim Star* into a suitable orbit around Handel's Planet when Diane came in. She smiled at him. She looked at the bow vision screen. A round green planet floated there.

"That's where we're going?"

He nodded. He said dourly: "I wish things had worked out better."

He was not pleased with himself. The Other Side of Nowhere had recaptured the *Rim Star*. He hadn't done it alone, or in a manner he considered at all befitting.

He turned up the magnification of the screen. The image swelled, and seas and green continents and icecaps became visible.

"Lovely!" said Diane, looking at it. Then she said: "I wish you were landing when we do! You ought to! I'm sure you can think of a way to do anything! You have, up to now!"

He shook his head.

"The *Rim Star*'s rockets won't burn out more than fifty or sixty acres. But even a spaceboat going down on Lawlor drive makes a hurricane that tears up a full square mile. If the *Rim Star* went down on her Lawlors, she'd make a real typhoon! It would probably wreck everything within a hundred miles and do terrific damage for fifty more. You can't land on Lawlors—unless a spaceboat in dire emergency. When it comes to the *Rim Star*—impossible!"

The image of Handel's Planet was now inches in diameter. It floated improbably in space. There was sunlight over most of it as seen from the *Rim Star*, but there were clouds, and the sunset-line was visible, and its surface features had a curious glamour over them. It was an effect of atmosphere, but it was singularly alluring.

Diane said: "Look! There's an island!"

Braden stared at her. It was the most obvious thing imaginable. On a settled planet—no. One could not create giant storms on a populated world. But on a new world, a world as yet unpeopled save by a very small working force . . .

"Wait here!" commanded Braden. "I think you said something important!"

He went to the skipper. He presented the idea. The skipper listened, at first skeptically. Then he said:

"A sound idea, Mr. Braden. A great advantage over rocket descent. It should be safer. You may get in touch with the ground people and work out the details. We'll stay in orbit in the meantime, of course."

Braden went back to Diane. He congratulated her warmly on her idea. She looked puzzled. He set about putting it into action.

It took days to get the project set up, of course. The skipper made no pretense of helping. He stayed in his cabin. Duckworth was frantically busy. He was changing the script of that epic, "The Other Side of Nowhere," so it would become an adventure-documentary of the actual attempt to pirate the huge ship *Rim Star*. Some of the scenes would admittedly be re-enactments, but Derr Carmody was involved, and the publicity possibilities were magnificent. Duckworth and Fortescue and Derr Carmody worked feverishly. All re-played scenes centered about Derr Carmody, and she was splendidly brave, and infinitely resourceful, and utterly touching, so a second stint of fame and stardom for her seemed certain.

It took three standard days to get the *Rim Star* in the most appropriate orbit around Handel's Planet, and there were other delays beyond that. The process of landing had to be discussed in irritating detail. Aground, the supervisors of construction made objections. But they badly wanted the *Rim Star*'s cargo. Men began to build barges of native woods in terrific haste. There were two sizable surface ships on the planet, for use in exploration. They could tow the barges. Meteorologists made elaborate calculations. A schedule began to be drawn up. Buildings were battened down. Trees that might be dangerous were felled.

Duckworth was entranced. He set up cameras in the control room to tape the ship's descent from her own vision screens. He arranged for shots to be taken of interior scenes which made no sense whatever to Braden, because they were to follow other scenes which had not been staged, and to precede others which had not yet been written. He saw Derr Carmody in the re-enactment of the flight from the passengers' quarters, when he'd punctured an air-lock door to prevent pursuit. He would not have recognized the incident, and he assuredly did not recognize her behavior. He shrugged.

The time came. An island had been chosen down below. It was two hundred miles from a continental coast and four hundred from the already-built structures of the colony. When the *Rim Star*'s cargo was available, towed barges would carry ashore cranes and bulldozers and dirt-movers first. They'd clear a landing place for the rest of the cargo. They'd bulldoze a highway. Then they'd land roofing and cement and reading matter and antibiotics. They'd unload beverages and ground cars. They'd deliver an ample stock for a workman's canteen, and clothing, food, clothes, tools, robot manufactories and all the ten thousand and two items of the *Rim Star*'s cargo.

And the steel for the grid. In three months that monster roofless cage would be up and working, and Handel's Planet would be part of the galactic civilization.

With Braden at the controls and the cameras trained upon vision screens, the huge ship slowed in her orbit. Braden matched velocities with the ground features below. The vast curved hemisphere of the planet seemed to bulge toward the ship. The horizon was plainly pinkish to the east, where sunlight filtered through clouds and ions and dust-particles in the air. It was distinctly bluish toward the west, where similar conditions let the red rays through and reflected only the blue. Underneath the *Rim Star* there was a vast stretch of mottled land-surface, with river systems and forests and mountain-ranges changing the look of things ever more markedly as the ship went down. There was the peculiar muddy color of sea-bottom as seen from space.

The ship touched air.

The storm really began at a hundred miles of altitude. The ship's Lawlor drive was designed to have an effect upon interstellar space itself, where matter was present only in the ratio of one atom per cubic centimeter. As the ship descended, the atomic population went up to thousands of millions of quadrillions in the same volume. And those populations went wild in the stresses imposed by the drive.

Braden, seated at the control board, saw the storm develop. The sea far below the *Rim Star* turned white, as winds whipped the water to waves and then tore the waves to spray. Giant billows formed and were instantly dissolved as monstrous clouds of mist driven by five-hundred-mile winds. The island which was the ship's intended landing place disappeared, hidden by whiteness. It was only a dome of tormented fog where its surfaces reflected wind blasts.

The *Rim Star* rocked. Even her gigantic size and mass was not enough to keep her steady. Braden held her with the drive controls. She went down and down. The air pressure around her varied from the vacuum of space to many atmospheres of crushing force. There were freaks of wind action. Braden saw a huge tree, torn bodily from the soil and with roots and limbs intact, flying level with the ship at five miles high. As the descent went on, destruction became incredible. There came an end to flying trees and such items, though. There were no more left. At three miles the ship was enveloped in howling fog. Only radar could penetrate the turmoil. It was an inextricable confusion of sea and soil and thousand-mile winds.

Still the ship stayed under control. Braden handled her with the delicacy of touch needed for the collection of spiders' webs, when he was controlling a monster vessel netting some tens of thousands of tons of space-burden. Hardy worked a camera in the control room. Diane worked another. Duckworth jittered.

Eventually the ship touched ground.

Then, of course, nothing could be done until the winds died down and the monstrous down-pour of whipped-up sea had stopped. Then the island was devastation, with only mud and rock above sea level. But within eighteen hours the small ships of the colony were offshore, crowded with men to work at unloading. They brought out cranes and began to empty the *Rim Star*'s holds. But there was a very large amount of cargo. Presently the two towing ships were towing hastily-made barges to the island empty and hauling them away again loaded.

Braden went to the mainland after the production-unit was landed. He found his former passengers working feverishly, shooting the sequences needed for the adventure-documentary "Other Side of Nowhere," which could not but be a financial success. He waited restlessly while Diane served as cameraman under Duckworth's orders. When she was not busy, they talked. They looked at each other.

Two days before the picture tape job would be finished, Duckworth took Braden aside. Derr Carmody had thrown an outstanding temperamental tantrum that day and shooting was suspended.

Duckworth said jerkily:

"Mr. Braden, you've been hanging around all the while we've been shooting. I don't think it's my sex-appeal that keeps you there, and I don't think it's Derr's. Look here! I like Diane! If I had a daughter, Diane would be my choice. If I were your age—. What the devil are you waiting for?"

Braden said awkwardly:

"I'm a merchant space officer. I've a master's ticket, but the pay and the long voyages . . . It wouldn't be fair to Diane."

Duckworth made an impatient gesture.

"Have you talked to the skipper lately?"

"No," said Braden. "He spends most of his time sleeping, and I've spent most of my time ashore. Why?"

"My business," said Duckworth, "is making tape dramas. I know how things ought to work out. You saved the lot of us from being killed or something considerably worse. So I figured out how this thing ought to end. I went to see the skipper."

Braden stared at him in amazement.

"The skipper's finished," said Duckworth briskly. "He sleeps all the time because he's done the last thing he wanted to do. Both last things—the men who murdered his wife and daughter, and landing the biggest cargo in history without a grid. He doesn't want to be the skipper of the *Rim Star* any more. He's going back to where his other daughter lives—he'll go back as a passenger on another ship—and he'll play with his grandchildren, and he'll sleep a lot, and the rest of the time he'll—remember."

"I wouldn't want—" began Braden.

"I wouldn't want to remember what he does, either!" snapped Duckworth. "But he's through, now! He's made the *Rim Star* into a valuable property for his son-in-law. There's plenty of need for a ship that can carry a colony, its tools and stores and people, in the same voyage that lands the material for a grid. The *Rim Star*'s that ship. You'll have to take her back to port, of course. And the skipper says his son-in-law will take his word that you're the best skipper she can possibly have. With new worlds to be colonized all the time you'll be busy—"

Braden said urgently: "If you're sure—"

"I am sure. And Derr Carmody won't object. She'll raise the devil, but that'll be to make a fine emotional scene. When Diane points out that there'll always be passengers on the *Rim Star* and that the skipper of the ship ought to carry his wife along on that kind of voyage, she'll calm down. It's true, you know."

Braden said feverishly: "Excuse me!"

He went away, hurriedly. Duckworth mopped his forehead, looking after him.

Diane came from where she'd been waiting. She asked uneasily: "What . . . what did he say?"

"If you'll let him find you—oh, quite by accident!—he'll tell you himself. But you've still got to work a camera for me until this job is finished!"

Diane smiled. Her eyes shone a little. Without a word she moved away, to be where Braden could find her, quite by accident.

The building of the colony went on. ■

The Extinction of Species

continued from page 16

rapidly vanishing, making room for the expanding population of humans. The elephants, the antelope, the rhinos and the hippos have all been drastically reduced, and most of this has happened in the very recent past. Poachers are a particularly serious problem even in the great wildlife reserves and parks.

In Arabia the white oryx will pass from the wild shortly as will others of the indigenous population. These are victims of jeep-riding locals using machine guns to prove their manliness. In one recent hunt over three hundred cars were used. To the outside world it would seem that what little government does exist could care less about the fauna in these desert lands. There are some who firmly believe that these lands became deserts through countless centuries of overgrazing by domestic goats and sheep. It would not be the only time that man has destroyed his own habitat as well as that of the wild creatures.

In South America we have never had a very clear picture of what the situation is relative to the native fauna. We do know that the guanaco and the chinchilla have been brought to near extinction since the introduction of firearms in the sixteenth century. The paca rana and the Andean wolf are both rare, but we do not have the evidence to say how rare.

In Asia three types of rhinoceroses, the musk deer and the sika deer are still being killed although extremely rare, because of the belief that powder made from the horns and antlers will correct impotence. In India the last three hundred Asiatic lions are given protection on reserves. This same lion existed in Europe until the days of Rome when it was exterminated for the pleasure of the masses in the great circuses.

The ibex was saved in Europe only through extended protection during the Nineteenth Century. The great elk of Ireland is extinct, and in western Europe bears are no longer found nor are wolves. Only about one hundred agrimi, forebearer of our domestic goat, remain on Crete and a few other islands. The tarpon, one of the horse's progenitors, and the auroch, ancestor of domestic cattle, have been killed off in their pure wild form. Another of the domestic horse's ancestors, Prezewalski's horse, still exists in zoos and perhaps is still to be found in the wilds of central Asia.

The oceans and the seas of the world have been a great provider for man since he first ventured along their shores. Of the earth's total surface by far the largest proportion is water. Here, too, man has taken a toll. Steller's sea cow, a great beast weighing three tons, and the spectacled cormorant are gone. The fur seals, sea otters and sea elephants came close to extinction but were given protection in time and have managed to come back very well. The green sea turtles, the walruses, many of the whales and some of the commercial fish are all reduced today but provided protection and unmolested habitat could return to their former numbers.

The great auk was a penguin-like bird that inhabited the islands and the coasts of the North Atlantic. Remains from these birds have been found in the cooking fires of ancient man along many of Europe's northern coasts. In historic times the great auk was

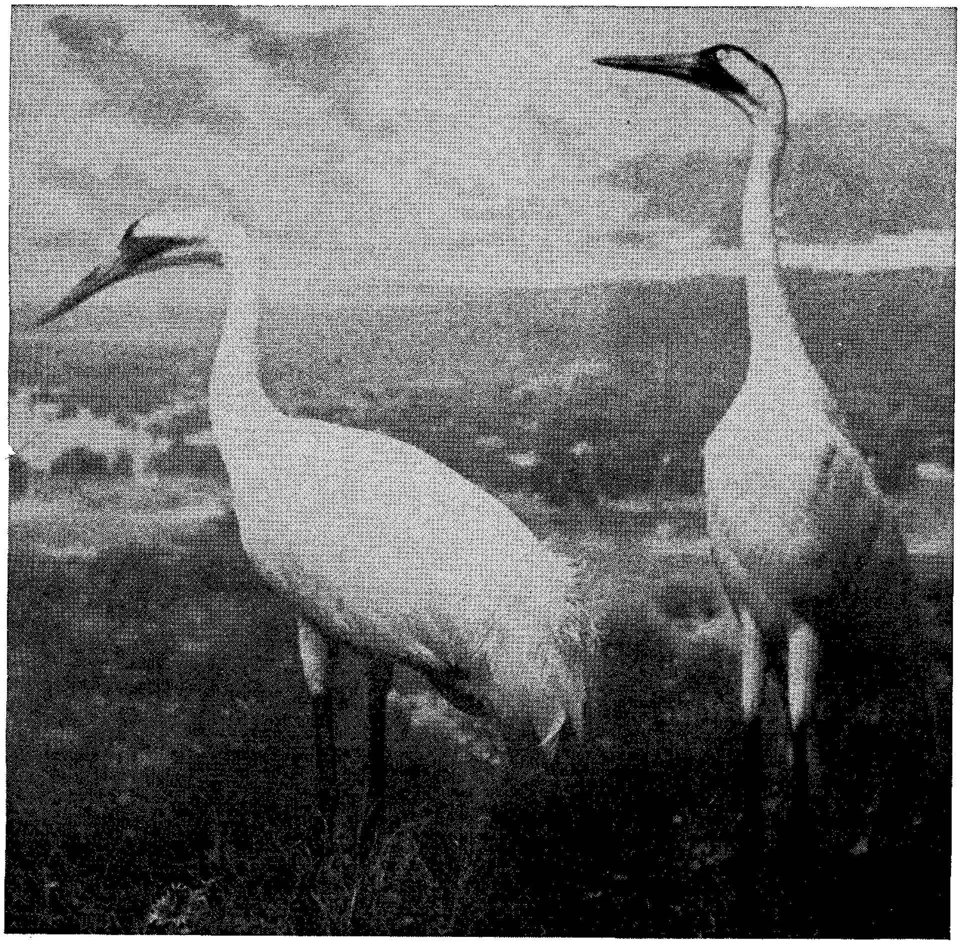


PHOTO TAKEN AT THE DENVER MUSEUM OF NATURAL HISTORY

WHOOPING CRANES—The whooping crane is the tallest bird in North America and the largest waterfowl in the world. During the last fifty years their numbers have remained extremely near to the vanishing point. Wintering areas for these birds are limited and the chance is good that they will never again exist in any great numbers. They have managed to survive this long only because of the efforts of conservation organizations with the support of the governments of the United States and Canada.

hunted for food, oil and feathers. When they became rare, men of science offered extremely high prices for skins and eggs. The last known great auk killed by man was killed for the sake of science on a small island off the coast of Iceland in 1844. A live specimen was reported in 1852 and in 1853 a dead auk was picked up off the coast of Ireland. The great auk has not been reported since.

To say that civilization is hard on wildlife is an understatement. Water pollution, indiscriminate use of pesticides and atmospheric contamination are a few of the hazards that face man as well as the other creatures who make this earth their home. The key deer came close to being wiped out by automobiles on the Key West highway. Autos are also a major mortality factor with game birds. Airplanes and birds have had their differences about who belongs in the air, and about who owns the airfields. Thousands of birds are killed yearly from crashing into man-made objects such as buildings and towers. Others leave traditional nesting areas because of noise and pollution.

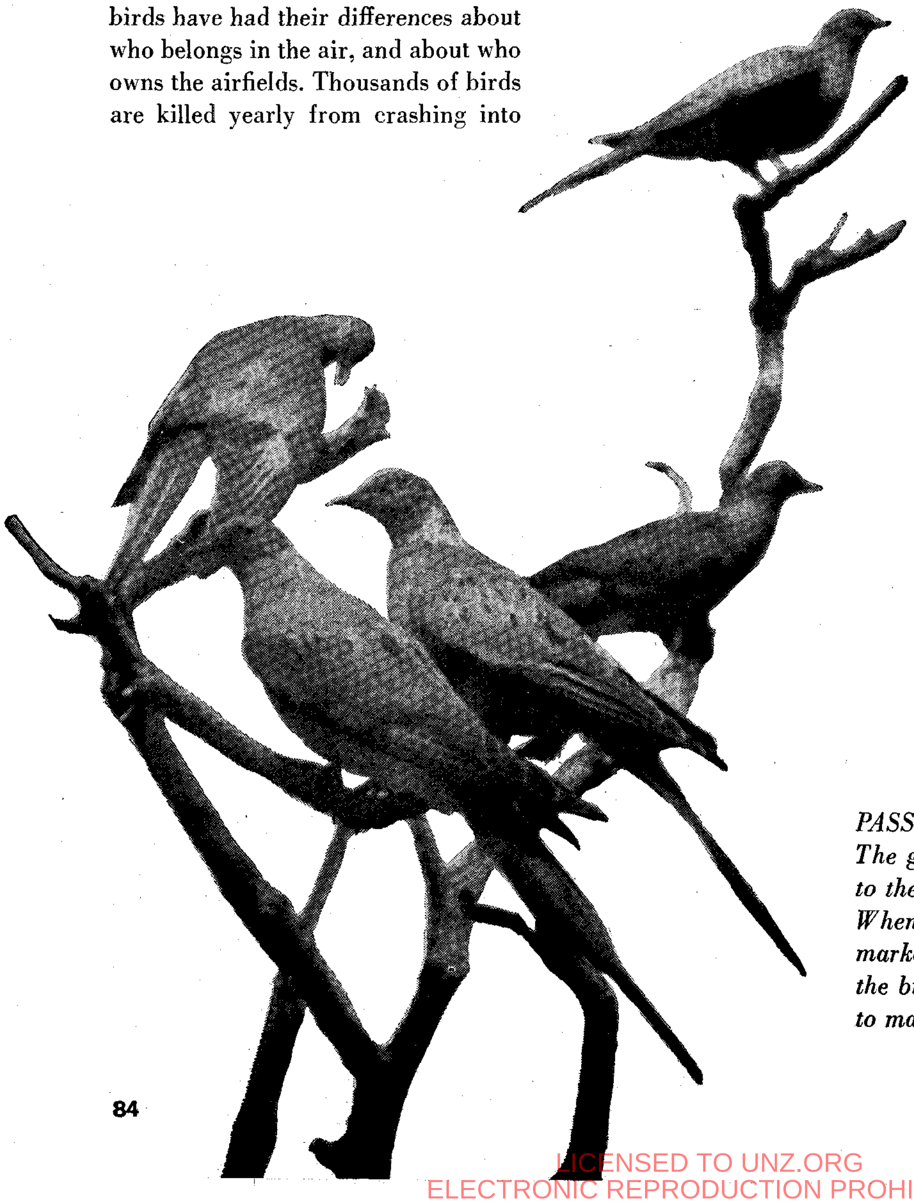
War has taken its toll on wildlife as well as human life. The last of Pere David's deer remaining in China were killed in the Boxer Rebellion in 1900. Eld's deer were reduced extremely by the Japanese troops in Burma during World War II. The last herd of wisent or European bison was almost wiped out in Poland during World War I. Cranes in Korea and Japan have been protected by the religion of the inhabitants of these lands for centuries, but this did not prevent the troops in the Korean War and the occupation forces after World War II from killing off many of the birds.

So far we have mentioned mainly creatures who have departed this world or those who are on the verge of doing so, but we should point out that all animal life except man is not on the way out. There are many animals that do well with man and even use his conquests of the world for an extension of their own range. The house sparrow, the starling, the common pigeon, the Norway rat, the house mouse, the domestic cat and the domestic dog have followed man around the globe, and almost everywhere man is found at least a few of these species will be, usually busy finishing off the native population of wildlife.

The cottontail, the European rabbit, the skunk, the raccoon, the red fox and many squirrels are expanding their range. The cattle egret which was found only in the old world a few years ago is today rapidly expanding its range over the grasslands of the new world. The first of these white birds are thought to have been carried across the Atlantic as victims of a great storm.

Occasionally an animal considered extinct shows up alive. The Bermuda petral was thought extinct for more than three hundred years but showed up again in 1951. Coelacanth fish were all thought to be extinct for seventy million years until rediscovered in 1938. These cases are rare, however, and when a species is really extinct it does not come back.

One obvious reaction that we might get relating to extinction is, "so what?" Extinction has been going on a long time and undoubtedly will continue as a natural function of evolution. Yet man is a part of nature, too, whether he likes it or not. His origin



PASSENGER PIGEON
The group was highly important
to the passenger pigeon.
When the great flocks were broken up due to
market hunting and deforestation
the birds ceased breeding on a scale great enough
to maintain their populations.

is the same as those of the other creatures and as such he is susceptible to the same fate as other mammals. The individual man meets his end in death, why not the species?

Wildlife, both mammals and birds, to most people is nice to have around, but the aesthetic values aside if we intend to learn anything of life, our life as well as the life around us, we can only do so through the living. Where would genetics be today if someone three hundred years ago had killed off all the fruit flies with a bug bomb? The fruit fly has provided some of the finest chromosomes that are available for genetic study. It is possible that if our ancestors had stoned all of the rhesus monkeys that we would still know very little about blood groups. What creature now near extinction might provide other clues to the secrets of life, perhaps even something as dramatic as a cure for cancer?

For those who have to put everything in dollars and cents wildlife is big business. Equipment and services relating to hunting and fishing produce an income of over four billion dollars a year in the United States alone. Animals are also a big tourist attraction all over the world. Managed wildlife provided with proper living space is a resource that can be renewed as long as the requirements for life are provided.

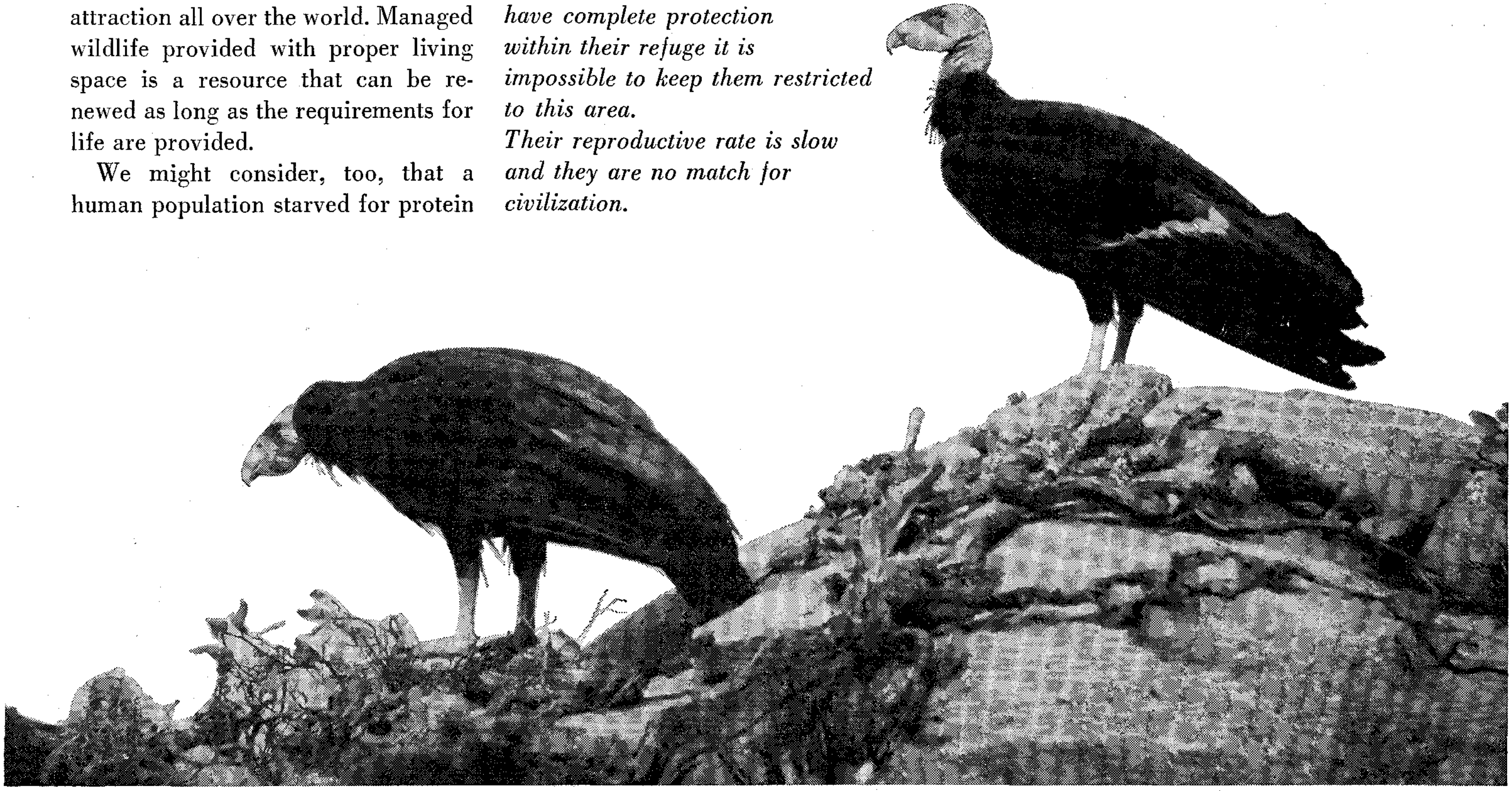
We might consider, too, that a human population starved for protein might better utilize its wildlife and its wild lands to produce this protein. The tundra of the north can produce more protein in the form of moose and caribou than in any other way. The plains of Africa are more suitable to antelope than they are to ill-kept cows and goats.

What then does the future hold? In the last fifty years man as a whole has seen a value in preservation and in conservation. Some animals we will no doubt have plenty of. Primarily these will be game animals with an economic value. Then there will be the highly successful creatures who reproduce well and are adaptable such as rodents, rabbits, sparrows and starlings.

Most of the wild places in the world and there are many will vanish and with them the large animals who make these places their home. The species for the most part will be preserved in zoos and in national parks. The great migrations of caribou and zebras will be a thing of the past, but zoos and parks will be larger and more attractive for as man loses the wilderness he will have more of a desire to preserve or recreate that which is lost.

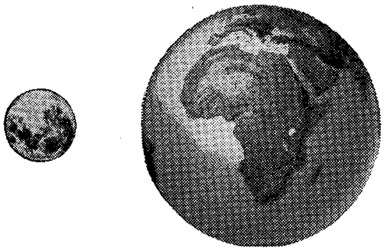
In time perhaps if the conditions on other planets are right species from earth can be introduced to continue their existence. When the day comes that the Noah's Ark from earth delivers its load of earth's creatures on some alien planet the local fauna better watch out for those from earth who will have survived will be top-notch competitors.

This, of course, is assuming that man doesn't blast himself off the face of the earth or poison his own environment first so that the human species joins the dodo. Even so the mysterious forces that recreate and evolve should continue to work, if not on this earth then elsewhere. Perhaps some day a billion years from now some strange creature will stop and wonder what factors were involved when that peculiar two-legged species became extinct. ■



CALIFORNIA CONDOR
The last remaining California condor refuge lies just outside metropolitan Los Angeles, and while the birds have complete protection within their refuge it is impossible to keep them restricted to this area.
Their reproductive rate is slow and they are no match for civilization.

PHOTOS TAKEN AT THE DENVER MUSEUM OF NATURAL HISTORY



NEW HOPE FOR UNDER-DEVELOPED NATIONS RESULTING FROM BASIC SPACE RESEARCH

Lunar and space missions such as Project Apollo seldom seem, in their far-out glamour role, to be closely related to that great fundamental...mankind. Yet one single aspect of the Apollo program—fuel cells—holds a vast amount of hope. Especially for under-developed nations.

Often referred to as "continuous batteries," fuel cells convert chemical energy directly to electrical. They are the newest power sources to emerge from scientific research into the realm of practical engines. The specific cell system aboard Apollo will be a Hydrox® unit, reacting hydrogen and oxygen, and is the result of research at Leesona Moos Laboratories, one of the first in America to undertake studies on fuel cells. Hydrox will supply electrical power for vehicle control, communications, and numerous other power needs aboard this lunar mission. Marking the first such use of these new power sources, the Hydrox installation will inaugurate a new age in the generation of electrical power. Final engineering and manufacture of the units for Project Apollo will be carried out by Pratt & Whitney Division of United Aircraft, under license from Leesona Corporation.

But space missions are only the first part of the story. At the same point in time that Leesona Moos began studies of Hydrox fuel cells, a concomitant project was undertaken to develop an even more advanced system...a cell using air as oxidant and inexpensive hydrocarbons or their derivatives as fuels. These hydrocarbon-air (Carbox®) and mixed-gas/air (Aminox™) developments of Leesona Moos do not require reactants of high purity, and are very flexible from a logistics point of view. Low cost and readily available fuels are used, and the universal oxidizer—air—supplies the other portion of the reaction mix. Because the fuel cell is an extremely efficient engine—efficiencies of up to 70% are attainable, vs. 30% for a conventional diesel—the result is an exciting new means of generating electrical power at low operating expenditure. Pratt & Whitney Aircraft in the United States, and Energy Conversion Ltd.,* of England, are carrying out further developmental engineering on these systems under license from the Leesona Corporation.

These new Leesona power sources, of high efficiency and low fuel costs, can readily be seen to provide the world with an entirely new type of electric generator. Fuels of the hydrocarbon variety are fairly abundant throughout the world. The fuel cell, though scientifically sophisticated, is neither unwieldy nor complex in its operation, and requires little maintenance. Units with power levels from those required for a one-family dwelling up to communal or industrial ground-power stations have been projected in Leesona Moos studies, and found feasible.

The impact Carbox and Aminox can have on the emerging countries is readily understandable. The development of a nation can almost be measured by its ability to produce and consume electrical power. In this mechanized world, virtually all industry waits on the availability of electricity. If an emergent economy must hold off its development until completion of large-scale hydroelectric projects, a distinct problem of time and expenditures arises. If, on the other hand, the nation had access to Carbox and Aminox type fuel cell systems, which could be tailored to the need and would operate on locally available fuels, the basic first step toward an industrialized economy and higher living standards would be achieved.

Leesona believes its efforts, plus the great additive capabilities of our United States and international partners, will soon result in working installations of the Carbox and Aminox systems to advance the standards of all mankind. Meanwhile, the sibling Hydrox system supplies power for a moon voyage. And research continues.

◆

**Energy Conversion, Ltd., is a new corporation founded by four British companies: National Research and Development Corporation; British Petroleum Company, Ltd.; British Ropes, Ltd., leading manufacturer of rope and steel cable; and Guest, Keen, and Nettlefolds Group, major steel manufacturers.*

LEESONA MOOS

LEESONA MOOS LABORATORIES

A Division of Leesona Corporation • Lake Success Park, Community Drive • Great Neck, L.I., New York

BRASS TACKS

continued from page 5

it would be a lot easier to just point a laser at the right place than to load a fleet of planes with silver iodide and fly a seeding mission two hundred miles from base or so—particularly since the information to control the mission almost certainly would come from the space station itself!

In less than four hours, then, the space station could spot a brewing storm, analyze it, predict its passage over inhabited territory, bathe it in enough laser radiation in the right place to either dissipate it or steer it away from the inhabited territory, and return to other duties.

Let us look for a second at the more obvious problem of the power receptor station earthside. I doubt if one hundred per cent efficiency can be attained, so I would anticipate a good deal of heated air directly above the station. It won't stay there long—it will immediately rise, leaving a low pressure area behind. Then the cold Greenland air will rush in from all sides, Coriolis force will have its effect, and we will have—what? A dust—or snow—devil? Maybe. A small tornado? Likewise, maybe. We'll want to find out—but maybe we'll want storm cellars while finding out.

Two parts rubbed me the wrong way. In "explaining" the reactionless drive, Ishie proposes three axioms of a Theory of Confusion, then remarks that the third seems to contradict the theory of Relativity. Since Ishie is doubtless a highly competent theoretical physicist, I would feel a lot better if the principle in question was not one of the basic axioms of the General Theory of Relativity. I trust Ishie will soon send me a proof of the *internal inconsistency of this theory?*

Second point: Ever since I first heard of the wheel type space station, I've hoped that someone would devote a paragraph to the novel sensation of diving down a radial spoke. There was a good opportunity in this story, but it was not developed as well as the rest of the story led me to hope.

Our good friend Mike cannot possibly fall straight down the center of the tube—in less than half a second, pseudo-gravity would pull him against the side of the tube. Then, as Mike slid faster down the tube, he would be pushed more strongly against the side, and the tube would appear to him as if someone, probably Dr. Confusion, was tilting the tube farther and farther from the vertical. (Confusion say, "He who forget about Coriolis force should take dive down radial tube in space station. It is remarkably stimulating to memory.") Figuring a coefficient of friction between Mike and the tube wall of 0.20, Mike has about nine seconds to notice this phenomenon, at the end of which time, the tube would be slanted only thirty degrees below the horizontal, Coriolis force being, at that point, about twice as strong as centrifugal.

At the bottom of the tube, the "river" rushes downward and back where Mike was coming from, thirty degrees from the vertical—until Mike hits the stream and is caught up in it, when it suddenly becomes horizontal. I submit that Mike, a trained engineer, would not long be confused as to what was happening, but the vertigo effects would still leave him quite impressed.

In conclusion, let us hear more from Space Station One. An ambulatory lab with those resources, and that crew of Galac . . . uh, Solarian Gadgeteers, is just plain loaded with story potential.

Albion D. Taylor
24 W. 68 Street
New York 23, N.Y.

Confusion say, "Author who makes no mistakes leaves no room for readers' imagination! Also should be in engineering research, where he can make bugless prototypes!"

Dear Mr. Campbell:

Mr. R. Milton's letter called my attention to your April editorial, which I had previously overlooked.

Your "mystery" of some "unknown sociologic mechanism" preventing growth of high-level civilizations among Negro peoples in Africa is an interesting one; it happens, however, that the facts are easily explained without the necessity of invoking any racial, sociologic or genetic factors.

It has been said that Africa is the birthplace of the human race. What is often overlooked is that man's parasites evolved with man. Africa is not only the original home of man but also of most of his parasites. Trypanosomiasis—sleeping sickness—hookworm, yellow fever and filariasis are native of Africa. But the worst is malaria, "the scourge of the tropics," which pervades Africa in its most virulent form.

Wherever malaria exists, and almost in direct proportion to its prevalence, the population is generally subnormal physically, mentally and economically. No high-level civilization has ever developed or even been able to maintain itself if conditions favor widespread incidence of this disease.

It takes three or four months for an infected individual to become free of symptoms. Ancient Rome and Greece had a six-month respite every year when cold, rain and wind prevented reinfection and spread. The populace in these countries had a chance to recover, and many escaped entirely. But when these countries became empires the importation of slaves and captives, many of them infected, spread the disease. This undoubtedly hastened their decline.

In Latin America there is a chain of mighty mountains. Cold, altitude and wind keep the population of flying insects at a low level, and major civilizations developed in these mountains. But these civilizations never broke through to the heartland although everything else seemed ripe. The Mayans were not a mountain people, but contrary to your statement that they developed a high-level culture in "the tropical rain-forests of the Yucatan peninsula," the Yucatan is dry and windy; much of it is semi-barren, and the forested areas are largely confined to a narrow coastal strip.

India has the Himalayas, and Indian civilization developed in the North. Europe, North America and China have cold winters. Egypt is dry and windy. But most of Africa is never cold and seldom very dry, and the land of *Anopheles, Aedes aegypti* and the tsetse fly knows no relief.

So you see, it is not necessary to postulate genetic or social factors for the failure of the Negroes to develop a major civilization. The "mysterious mechanism" is nothing more than the small and insignificant mosquito.

A. Hexter

Berkeley, California

Could be the answer—but you aren't talking about the same part of Yucatan I am, evidently! Chichen Itza was NOT "dry and windy"!

Dear John:

P. Schuyler Miller's review of my book "Explorers of the Infinite"—Analog, October, 1963—gives a much blacker picture than I feel he holds and all but one of the "errors" are not supportable by arguments stronger than questioning the preciseness of the language used.

He is correct in saying that *The New Review* serialization of "The Time Machine" appeared under just that title. I used "The Time Traveller's Story" — despite access to primary sources—because references of Wells and his bibliographers indicated that it was the original or working title. I agree that this usage was not clear and should have been elaborated.

Miller's statement "There is nothing in it—'The Rediscovery of the Unique' —that has any remote bearing on 'The Time Machine,' " is another matter. It is one thing to argue whether this should be termed a "version" and it is understandable that someone reading it out of chronology might be puzzled at its connection. However, facts cannot be argued away, for "The Rediscovery of the Unique" and it's theory stem from the first version of "The Time Machine" titled "The Chronic Argonauts" *(The Science Schools Journal,* 1888*)*. Therein, Wells has Nebogipfel, his "first" Time Traveler, in dialogue, present the premise that no theory, idea, atom or moment in time is precisely alike nor can they ever be exactly duplicated. This idea, termed "nominalism" was expanded and clarified in "The Rediscovery of the Unique" and forms one of the foundations of "The Time Machine." In doing so Wells anticipated Alfred Korzybski's "general semantics" by forty-two years. "The 'now'," Wells said in introducing the Random House 1931 edition of "The Time Machine," "therefore is not instantaneous, it is a shorter or longer measure of time, a point that has still to find its proper appreciation in contemporary thought." "The Chronic Argonauts" itself, as well as a very precise pinpointing of the origin of "The Rediscovery of the Unique" may be found in Bernard Bergonzi's "The Early H. G. Wells" (Manchester University Press, 1961).

Completely unwarranted is Miller's remark: "I also doubt the statement that sections of "The Time Machine" appeared as a series of articles in *The National Observer* in 1894 . . ." He need only go to the New York Library's reference room at Forty-Second Street and Fifth Avenue to learn it did appear, as stated as seven complete "articles" with the following titles and dates: "Time Traveling;" "Possibility or Paradox?" (Mar. 17); "The Time Machine" (Mar. 24); "A. D. 12,203;" "A Glimpse of the Future" (Mar. 31); "The Refinement of Humanity. A. D. 12,203" (April 21); "The Sunset of Mankind" (April 28); "In the Underworld" (May 19) and "The Time Traveler Returns" (June 23). Two *other* versions of "The Time Machine" which never were set up in type are described in "H. G. Wells, A Sketch for Portrait," by Geoffrey West (Gerald Howe, 1931).

Miller says there are only ten stories in Burrough's Mars Series whereas I claim twelve. There are only ten in book form but there are two others that have appeared only in magazines, "John Carter and the Giant of Mars" *(Amazing Stories,* Jan., 1941) and "Skeleton Men of Jupiter" *(Amazing Stories,* Feb., 1943.). The latter, despite it's title, is a John Carter of Mars story. One cannot arbitrarily pretend these do not exist or count the two as one just because someday, someone, *might* publish them in one volume.

To a degree Miller has reviewed the book he would like to see me write rather than the one I have written. He is right when he says I could have elaborated, but the book is 115,000 words as it stands. If it does well, there will be a second volume and even a third and a fourth. However, whether other volumes ever appear is dependent in no small measure upon balanced reviews in the very influential pages of magazines like Analog presenting *positive* as well as negative factors to guide the intelligent reader as to the value and interest of a book like "Explorers of the Infinite."

Sam Moskowitz

Dear John:

Sam's letter demonstrates the very point I was trying to make about "Explorers of the Infinite." In a couple of paragraphs he has crammed information about the development of Wells' "The Time Machine" that is in no book I know of. It would have made his book immensely more valuable, and should have been in it.

I will give him the Burroughs argument — that there were twelve Mars "novels"—on points. *Amazing Stories* probably called "John Carter and the Giant of Mars" and "Skeleton Men of Jupiter" novels, rather than novelettes, which makes Sam's count of twelve technically correct. He is *not* correct if he now says he meant twelve "stories," because "Llana of Gathol" is a compilation of four *Amazing* novelettes, making a total of fifteen *stories* about John Carter and Mars.

Our real disagreement, however, is about the prehistory of "The Time Machine." Wells himself is responsible for some of the confusion. An author's note in the first edition apparently said: "The Time Traveler's Story" appeared, almost as it stands here, in the pages of the *New Review.*" Bibliographers and biographers, without checking the actual published serial, assumed that its title was "The Time Traveler's Story," and have been saying so down through the years. Since he *had* read the serial, it was Sam's responsibility to correct this error, not perpetuate it.

In the same note Wells also said: "The substance of the first chapter of this story and of several paragraphs from the context appeared in the *National Observer* in 1894." He discusses these seven pieces in "An Experiment in Autobiography," and calls them "papers". The impression Wells gives is that, like the unpublished and lost "The Universe Rigid," these were serious articles presenting his ideas about time and the future—not fiction. Indeed, in the book, Sam called them "articles". However, since he has read them and considers them another serial version of "The Time Machine," and since I have not seen fit to come to New York to do so, I have to accept his statement of fact.

As for "The Rediscovery of the Unique," I still can't see it as "A second version of 'The Time Machine' "—the statement I questioned in "Explorers of the Infinite." It is a pioneering *article* on semantics and scientific philosophy, and Sam now tells us that it covers material expressed fictionally in "The Chronic Argonauts," Wells' *first* time-travel story. Needless to say, I have not read that rarity, and the only vestige of the article I can find in the serial version of "The Time Machine" is one phrase in the opening chapter: "ordinary human perception is an hallucination." This did not survive in the book in any edition I have seen.

I admit to being a nit-picker; I spend hours, almost every day, hounding engineers and chemists who mean one thing and write another. A book as important as "Explorers of the Infinite" is going to be used as a reference for a long time. As such, it should not have misstatements about writers of Wells' stature—or any writer. Apparentaly Sam kept the errors in the book because recognized "authorities" had made them. To me, this kind of diffidence is very questionable scholarship. In these matters *Sam* is the authority—at least when he is citing facts about something he has seen. He has not only the right but the responsibility to correct errors, even if they were made by Wells himself. And I, or any other reader, have a responsibility to correct him when he means one thing but publishes something else.

P. Schuyler Miller

Dear Mr. Campbell:

The December issue marks the end of another year and makes it a quarter of a century of ASF on my shelves. 1963 was a pretty good year for the magazine. Not one of your best but a good one.

For the AnLab:

1. "Conversation In Arcady". It was a toss-up between this and MacKenzie's yarn but I think Anderson holds the thin edge. This is good extrapolation and presents what could be a very real situation; a situation which, if current theory holds, will have to be faced when man goes venturing to the stars. The theme has been done before, of course, but Anderson does an excellent job of portraying the frustration which will confront the star-rovers.

If the current theories hold—that is. What if they don't? What if it is possible for material objects to exceed the speed of light? What sort of engines will be necessary to drive the star ships? Interesting speculation.

2. "Thin Edge". Good solid science-fiction but somewhat disjointed. This would have been considerably improved if it had been longer. The introduction, while it gives background information, has little relationship to Part II. Extra length was needed to bridge the two parts.

3. "Dune World". The novels usually rate well above the short stories but the first part of this serial is rather disappointing. Except for some references to space travel and the arrival at Arrakis this could be the first part of a historical novel set in Medieval times. Of course the introductory material is necessary for background but this background doesn't ring true. I hope parts 2 and 3 manage to redeem it.

4. "The Right Time". I suppose some of the readers may have enjoyed it. I didn't. Psionics makes a better garnish for a story than it does the main course.

Speaking of psi, you've been pushing theoretical psionics at us for some time in the form of some not very good fiction. How about a fact article on the latest developments? Exactly what real progress has been or is being made? How are the university experiments going?

The artwork. You ought to present Herbert Stoltz with a set of ASF of fifteen to twenty years ago so that he can get some idea of science-fiction illustration. Most of the interior illustrations published this year would not have been out of place in any magazine of contemporary fiction. They have had little to indicate they were illustrating a science-fiction story.

And how about some new artists? Schoenherr is excellent on the covers but his interiors are atrocious. Schelling is better at interiors than Schoenherr—but he doesn't win any prizes either. The new size offers a fine opportunity for artwork—you need to beat your art director about the ears a bit.

We have to gripe about something, you know.

Despite the criticism I think that Analog still gives the reader more good science fiction than any of the other magazines. It is the only one I read regularly—the others I pick up off the newsstand if they look interesting enough, but I subscribe to ASF—and look forward to doing so for another twenty-five years. There has been an upturn in the quality of the stories of the past year and I hope it continues. You need to get some of these writers off with Herbert Stoltz and beat them about the ears, too.

Roy Tackett

915 Green Valley Road NW
Albuquerque, New Mexico

Re psi: Most formal, university-type experiments are being done in Russia. U.S. universities refuse to examine the matter.

Art being a matter of taste makes it a little difficult to decide what "good" art is!

Dear Mr. Campbell:

Your December editorial was interesting, as usual, and delightfully controversial, also as usual. There are, however, a few points which may bear clarification.

The genetic code is really quite a simple one (not to detract at all from the magnificent work that went into cracking it)—for such and such an arrangement of bases in the DNA codons, a certain amino acid appears in the protein which is formed with the aid of the DNA's information. It seems to be a one-to-one relationship, evidently with some redundancy. There is no real message as such other than this, since we usually do not include the order of the codons in the DNA when we refer to the genetic code.

Let us assume that Dr. Weinstein's work is eventually confirmed, and that all organisms do have the same base code for each amino acid. As you say, this would indicate that the code has a fantastic ability to keep itself intact, since it has probably been around for the past two billion years. You proposed that this may be due to The Way The Universe Happens To Be. Possibly. It should be kept in mind, however, that the amino acids themselves do not come in contact with the coded bases. They are carried there by the so-called transfer RNA, the opposite end of which carries the actual coded key that fits the DNA-RNA lock. It would seem unlikely that this code would be invariant from planet to planet, since the amino acid is so far removed from the coded position. As a matter of fact, it seems unlikely that it would not vary here on earth.

But now—I had to get to it sooner or later—for my main dissension. You pointed out that the best way to carry a message across long periods of time would be to use some self-replicating device. You more or less used the genetic code as an example, further postulating that its stability may arise from employing The Way The Universe Happens To Be to carry the message. I don't believe you can use TWTUHTB to carry a message, because if you do happen to find a stable configuration it's bound to be random. That's the way the universe is, due to a little matter called entropy. And, as we both know, a message is non-random. It's The Way The Universe Very Probably Isn't.

In other words, you implied that "message" was synonymous with "code." Not so. You can possibly use universal laws or functions as a code, but you still have to find a way to send your message, which means arranging some part of the universe in a non-random manner. The code of living matter may be stable, but the message very obviously isn't.

By the way, the organic bases are adenine, cytosine—*not* cystine, a sulfur containing amino acid—guanine and uracil. And that's in RNA. In DNA, which I believe your discussion was mainly about, uracil is replaced by thymine.

DAVID WILSON

523 Harley Dr. #4
Columbus 2, Ohio

The laws of Thermodynamics do not apply to messages; the laws of Infodynamics must be used. Dr. Wayne Batteau pointed out that since Information is known to be negative-entropy, the laws of Infodynamics are very different from those of Thermodynamics. Expressed in English, the two are:

Thermodynamics

1st. You can't win.
(Conservation of Energy.)
2nd. You can't even break even!
(Law of Increasing Entropy)
3rd. Moreover, you can't get out of the Game!
(You can't reach absolute zero.)

Infodynamics

1st. You can win,
2nd. Provided you support a friend . . .
3rd. . . . and quit the game while you're winning.

The above Laws of Infodynamics can be mathematically derived from Information Theory—"that's not *a joke, son!"*

Dear Mr. Campbell:

At the recent Science Fiction Convention, James Blish called for "loving criticism of SF in the letter columns of the magazines. I think that his point in that talk was well taken, and am including an essay on one of the stories in the October issue of Analog. You may print it, use it to light a fire, or forward it to Poul Anderson. I would prefer, of course, to have you print it.

Following are my AnLab votes:

1. "The Three-Cornered Wheel," by Poul Anderson.
2. "A World by the Tale," by Seaton McKettrig.
3. "War Games," by Christopher Anvil.

10^{10}, and dead last: "Where I wasn't Going," by Walt and Leigh Richmond.

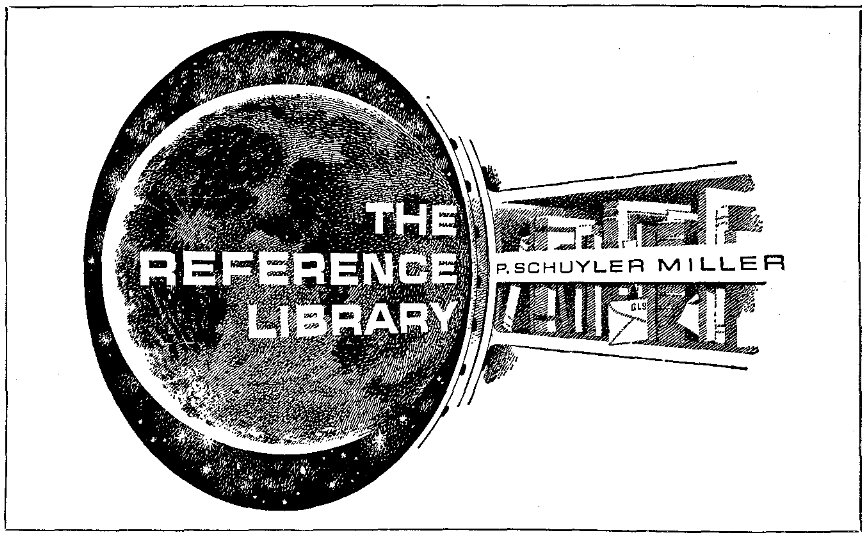
Poul Anderson is one of the best science-fiction writers currently practicing the trade. He can create an alien environment, or extrapolate a possible future, so that it is believable, supports the story, and does not intrude itself into the reader's consciousness to the extent of overshadowing the story. Mr. Anderson is able to tell an arousing adventure story, create and hold on to suspense, or keep a farce going at a light-hearted and delightful romp. All of which means that Mr. Anderson can handle science, psychology, and words so well that he deserves all of the success he gets.

Mr. Anderson's "The Three-Cornered Wheel" is the best story in the October, 1963 Analog, yet I must admit I am disappointed with it. Nothing by this man can be bad, but certainly some of his work can be less good than the rest. "The Three-Cornered Wheel" is nothing but a gimmick story, about constant width polygons. The rest is just window dressing. Admittedly, the gimmick is a good one, and the window dressing is done by an artist, but the gimmick is still the hero.

My only real acquaintance with Poul Anderson is through his writings, but you can get to know something of a man this way. I know that he is a careful, conscientious craftsman, who takes great care to write well. It is a shame to see him let his standards down, as he has done several times lately. Especially when one compares the recent stuff to "Three Hearts and Three Lions."

JOHN H. MAURER

So—and what is any story but a gimmick of one kind or another?



THE REFERENCE LIBRARY

P. SCHUYLER MILLER

THE MACMILLAN CLASSICS

One day early last fall, taking a short cut through the juvenile section of a local bookstore, I spotted two familiar titles on the spines of a pair of books on a bottom shelf. They were both by Jack London—"Before Adam" and "The Star Rover"—and they turned out to be the first two of a series of reprints which, with the third book, took on the collective name: Macmillan's Library of Science Fiction Classics.

Six books in this series had been published by the end of 1963, when this is written. Macmillan has not answered my questions, so I can't say whether they look on it as a series for juveniles—which some books certainly are not—or what plans they have for the future. It may be that they have no plans, but are just feeling their way. Not all the books are science fiction.

These are handsomely printed editions of good old books, with a number of worthwhile special features. Five out of the six are freshly illustrated by good artists. They are introduced by biographical essays on the authors, written by such familiar friends of science fiction as Willy Ley, and have "epilogues" by eminent scientists in which the authors' themes or scientific hypotheses are discussed —against the scientific concepts of the time the books were written, and in view of our present knowledge and ideas. Several of the books conclude with fair to good bibliographies of the authors' books.

The hero of Jack London's "Before Adam"—172 pages; $3.95; illustrated by Leonard Everett Fisher—"remembers" a previous life, thousands of years ago, when he was one of the Tree People. As anthropologist Loren Eiseley points out in his epilogue, London was drawing on two perfectly respectable ideas of his time—1906: the concept of a racial memory, which would enable his hero to recall in dreams the experiences of remote ancestors, and the still-novel evolutionary idea that Man's forerunners had lived in trees. He also uses the idea of men of different evolutionary stages living side-by-side, so that Big-Tooth, deserted by his parents, can come down out of his trees and become one of the Cave People—primitives at a Lower Paleolithic level who are in turn exterminated by the bow-using Fire People. I can't help wondering whether Edgar Rice Burroughs got the germ of "The Land That Time Forgot" here. Scientifically dated but vigorously told, "Before Adam" is still a good story.

London's "The star Rover"—336 pages; $4.50; also illustrated by Fisher—is an even better book that is only by courtesy science fiction. The basic mechanism is the same: racial memory. But now his narrator, instead of recalling one long-ago life led by a remote ancestor, relives several—as a hot-headed swordsman in Mazarin's France; as a boy in a wagon train ambushed by Mormons and Indians in the Mountain Meadows massacre; as a seaman who schemes himself princely standing in the "Hermit Kingdom" of Korea; as a Norse swordsman in the service of Pontius Pilate; as a castaway on an island in the Antarctic. It is also a grim exposé and attack on the brutality of the prisons of 1915, for its hero relives his earlier lives when trussed up in a straitjacket in the solitary dungeons of a federal prison, where he is serving a life sentence for murder. If you read—or re-read—the book, I think that in the more literary early sections you'll detect a hint of the same awkwardly flowery style that Burroughs used in his early books. London was by far the better, or at least more modern writer by present standards, but both men, self-taught writers, used the style of their time.

So far as style is concerned, the most modern of these "classics" is the book by the French novelist and biographer, André Maurois, "The Weigher of Souls & The Earth Dwellers"—187 pages; $3.95; illustrated by Fisher. A Russian-born philosopher, Dr. Jacques Choron, discusses the ideas of a life-substance that are behind the first, short novel about a London doctor who does manage to not only weigh but trap and bottle up "souls". The theme is fantasy by present criteria, but the method is the best science fiction. As for "The Earth Dwellers," this novelette is one of a number of "fragments of a universal history published in 1992" that Maurois wrote. My own choice would have been his "The War Against the Moon" which I remember from a 1927 issue of *Forum*. In this satiric bit, inhabitants of Uranus are experimenting with and misinterpreting the "insects" of Earth.

"Dr. Ox's Experiment"—101 pages; $3.95; illustrated by William Pené du Bois—is a chemical and biological farce by Jules Verne, reprinted in the early Gernsback *Amazing Stories*. The people of a sleepy Flemish village are brought to vigorous, comic life when their town is saturated with oxygen. Willy Ley provides a typically fine introduction, Dr. Hubertus Strughold of the USAF Aerospace Medical Center in Texas discusses the science or lack of it, and the bibliography of Verne's books is lavishly illustrated with reproductions of engravings from the original editions. The book itself is also a stunt: you turn it sideways, so that it opens at the top, and read it in two-page units. The illustrator is best known for his work in children's books, and that's where most stores shelve this one. His tongue-in-cheek Nineteenth Century style is just right.

"The Hopkins Manuscript," by R.C. Sherriff—337 pages; $4.95; illustrated by Joseph Magnani—is a legitimate science-fiction classic, although —as Dr. George Gamow points out in his epilogue—Sherriff's science is out of date and he was not much concerned with it in the first place. What we have, as we do in some of H.G. Wells' best books, is a full-length portrait of a "little man" who endures cosmic events. Edgar Hopkins, middle-aged, snobbish poultry-breeder and member of the British Lunar Society, remains himself even though the Moon falls into the Atlantic and the remnants of European and American mankind fight to the death over the fragments. The theme, if you like, is the durability of conservatism and the conservatism of war. The book first came out in 1939 and lives well.

Finally, the name is presumably what persuaded Macmillan that David Lindsay's "A Voyage to Arcturus"—244 pages; $4.95—is science fiction. What it actually is, is a metaphysical allegory of Everyman's search for the meaning of life and the universe. It falls into the company of C.S. Lewis' "Perelandra" and the mystical novels of Charles Williams, tormented with symbolism and metamorphism. Maskull's pilgrimage through the nightmare countries of Tormance, giant planet of Arcturus—or rather of the double star, Alppain and Branchspell, is a kind of philosophical nightmare. He sprouts strange organs and loses them by absorption or violence; he is driven to a kind of ritual murder and never knows the reason; he meets monsters and monstrous people, spaced out like sentries along his way. A remarkable book for 1920 or for any time, "A Voyage to Arcturus" is now in its first American edition, as unclassifiable now as forty years ago.

Macmillan has an unusual series going—if only it will publish some science fiction.

THE VIEW FROM A DISTANT STAR

By Harlow Shapley • Basic Books, Inc., New York • 212 pp. • $4.95

In the days of my youth, Harlow Shapley was the astronomer who gave us the deepest views into the mysteries of the universe. Before that, oddly enough, he had been the leading adversary of the idea that the nebulae—or some of them—were "island universes." This book is a collection of speeches and articles, delivered and written over the years, reviewing the present state of the astronomer's art and offering some suggestions about the future of Man in the universe. The former will be familiar ground to most readers of Analog.

Once he has brought the history of the universe up to Man, however, Dr. Shapley lets himself go a little more. His ideas are not especially novel to this audience, but his approach to them may be. The parenthetical note, for example, that if a nuclear war destroys ninety-nine per cent of the human race, there will *still* be twenty-five million men and women to start reseeding the planet, neatly pins down the point that human society rather than the species is likely to be the victim of international stupidity. There are some rather trite asides on astrology, dowsing, flying saucers and such—then a sharp chapter on the hazards of "steeple-climbing," the over-specialization of present-day science, and the resulting challenge to education.

In his final chapter, "A Design for Fighting," Dr. Shapley is making the international scientists' inevitable plea for an end to the waste of war, and suggests that we employ our energies, as in the International Geophysical Year, in multi-front guerrilla warfare against illiteracy, old age, the cult of uniformity, and the antiscientific attitude of masses of humanity.

In effect, this is a veteran scientist's summing up of ideas and principles that were novel at one time, but that he and others like him have by now made almost trite to the part of the public represented by Analog readers. To general readers these facts and ideas may still be strange; we take them for granted.

JUDGMENT ON JANUS

By Andre Norton • Harcourt, Brace & World, Inc., New York • 1963 • 220 pp. • $3.50

This is by all odds the most fantastic and "farthest out" of Miss Norton's interplanetary adventure stories. Except for the nominal age of its hero, it retains very few traces of having been intended for a teen-age audience. Let's forget that stigma and enjoy ourselves—huh?

Niall Renfro is one of the refugees from the galactic war who have been the heroes of other Norton books. We encounter him in the Dipple or refugees' ghetto of the planet Korwar as he finds that he must sell himself into bond-servitude—the process that brought many "first families" to America three hundred years ago. He winds up on Janus, a forested world settled by a fundamentalist sect much like the conservative Amish in the region between Pittsburgh and Miss Norton's native Cleveland. But the story does not really begin until he finds a forbidden treasure in the forest, is infected with the "Green Sick," and is slowly transformed into a similitude of the native green race of Janus.

In this new form Niall sometimes has his own memories and sometimes the memories and knowledge of Ayyar, a warrior of the green race of some centuries before. He has a mission, but cannot quite discover it. He knows a little about ancient perils which the human settlers of Janus have not yet discovered—but not enough to protect himself. Then a girl is trapped by the jewel bait, and they are hunted into strange and terrible places by equally terrible creatures.

Andre Norton makes extremely effective use of *not* tidying up every loose end and explaining every detail; she believes in letting the imagination stretch and climb. But this time she has left too much untold. Unless there is a sequel in the publisher's safe, I am going to start sticking pins into a doll!

WAY STATION

By Clifford D. Simak • Doubleday & Co., Garden City, N.Y. • 1963 • 210 pp. • $3.50

If you can't stand what Kingsley Amis called Clifford Simak's "pastoral" approach to science fiction, then this new novel isn't for you. If—like me—you enjoy it, you are likely to find "Way Station" one of the best books of 1963, and far ahead of "They Walked Like Men."

Enoch Wallace, returning to the family farm in the Wisconsin back country shortly after Gettysburg, encountered a wandering stranger—an extremely strange stranger—who offered him an equally strange job. The venerable farmhouse where two or three generations of Wallaces had been born and lived was converted into a relay station for an intergalactic matter transmitter, and Enoch became its custodian. Through the decades the utterly strange peoples of utterly strange worlds passed through the Earth station, leaving memories, gifts, friendships with the lonely man who received and made them comfortable, and passed them on. Then in our time curiosity tipped the balance a little too far, and the CIA became interested in the farmhouse on the bluffs above the fledgling Mississippi. At the same time a crisis arose in the Inter-Galactic Council—a politics-as-usual situation that wryly suggests the kinship of social beings everywhere—and a third in Enoch's relations with his neighbors.

I think it's the best book Clifford Simak has written since "City," but I'm a country boy myself and easily wondered. I still say you'll be sorry if you pass it up.

VIEW FROM A HEIGHT

By Isaac Asimov • Doubleday & Co., Garden City, N.Y. • 1963 • 252 pp. • $4.50

Here are seventeen of Dr. Asimov's monthly essays and articles from *Fantasy & Science Fiction*, a companion to *Fact and Fancy*. Like the first collection, it is totally characteristic yet totally indescribable. The Good Doctor has at a little of everything, distributing facts there like flower girls strewing rose petals at a Victorian wedding, jabbing with an idea there to see if his reader is awake, all the while juggling bigger and ever bigger figures with the utmost dexterity.

Four chapters on biology toy with some ideas about the scale of life forms, and then go into possibilities for life on other worlds. Three more play around with chemistry, five are for physics, five more are for astronomy—including the still-novel suggestion that Jupiter may be a likely place to look for extraterrestrial life. Burroughs Bibliophiles will note that again ERB was right in spite of science.

If you have already read these and Dr. Asimov's other articles in *F&SF*, you know what to expect; he's done some updating, though. If you haven't, by all means try this sample. It's like a strange cocktail—you may find you like it, even if it does have everything within reach in it.

EMPIRES IN THE DUST

By Robert Silverberg • Chilton Books, Philadelphia, Pa. • 1963 • 247 pp. • $4.95

It seems that nowadays everybody is writing a popular book on archeology. These range all the way from collections of pretty pictures and antiquated information, produced by directors of art museums who couldn't care less who made what or why, to rehashes of the "Gods, Graves and Scholars" formula: success stories of picturesque diggers. Bob Silverberg's first archeological venture for Chilton—openly a juvenile—was in the latter vein. This new book and its predecessor, "Sunken History," are far better fare.

While reworking relatively orthodox material on the political history of ancient peoples, as revealed by archeology, Bob uses his well-known narrative ability to make their stories move. None of the six chapters on the Egyptians, Hittites, Indus civilization, Phoenicians, Etruscans and Incas fails to be interesting, and a meaty reading list at the end sends you to the right—and the available—books. Like one of his sources, Geoffrey Bibby, he shows these early nations in the setting of their places and times, as part of a world that we are only beginning to rediscover.

I hope this publisher, or another, gives Bob Silverberg a chance to bring the people themselves to life in a book that deals less with kings and more with what it was like to live in Kish or Thebes or Byblos long ago.

LOST ON VENUS

By Edgar Rice Burroughs • Canaveral Press, N.Y. • 1963 • 318 pp. • $3.50

CARSON OF VENUS

By Edgar Rice Burroughs • Canaveral Press, N.Y. • 1963 • 312 pp. • $3.50
Ace Books, N.Y. • No. F-247 • 1963 • 192 pp. • 40¢

ESCAPE ON VENUS

By Edgar Rice Burroughs • Canaveral Press, N.Y. • 1963 • 347 pp. • $3.50

With these three volumes Canaveral completes its hardcover resurrection of the misadventures of Carson Napier on the planet Amtor—Venus to the rest of us—and Ace, which was earlier in the field with paperbacks of the first two Venus books, forges on with Number Three of the series. One more unpublished adventure of Carson of Venus will be combined with the last two John Carter novelettes in another Canaveral volume, later this year.

Since illustrations have become an important feature of the Burroughs revival books, for fans and collectors as well as neophytes, it is worth saying that Ace's cover for "Carson of

Venus," by Frank Frazetta, is about the best anyone has done. Canaveral is now reprinting the original illustrations as well as the text: five by St. John in "Lost," six by John Coleman Burroughs for "Carson," and five by Burroughs in "Escape." The original jacket illustrations also seem to have been used.

"Lost on Venus" I described here when the Ace reprint came out. "Carson of Venus," which follows, is in many ways the most interesting of the Napier/Amtor series. Serialized in *Argosy* in 1938 and issued in boards in 1939, this is a rough-and-ready satire of Nazi Germany—by no means the obvious thing for an adventure yarner to undertake that early in the game. Carson and Duare, escaping by air from the scientists of Havatoo, first undergo a standard capture-and escape episode with the Amazons of Houtomai, escape, by-pass Duare's homeland of Vepaja, and come down on the neighboring island-continent of Anlap. Most of the country has been taken over by the Zanis, ridiculous but ruthless, and the bulk of the book is taken up with plot and counterplot in the attempt to overthrow their *fuehrer*, Mephis, and restore the kingdom to the Good Guys. There is a secondary heroine, Zerka, who is a good deal more interesting than Duare and one of Burroughs' closest approaches to a woman worth knowing. Like John Carter over on Barsoom, Napier now gets a local title and estate as Tanjong of Korva; in an anticlimactic bit he has to go back to Vepaja and kidnap Duare.

"Escape on Venus" was pieced together from four "novels" or novelettes that appeared in *Fantastic Adventures* in 1941 and 1942. As in the later Mars books, Burroughs seemed to have lost interest in really filling out the details of Amtor. Although Carson and Duare are storm-swept into the unknown northern hemisphere of Venus, the successive peoples by whom they are captured and from whom they duly escape are no more than collections of freaks, as bizarre as Burroughs could make them but contributing little or nothing to a rounded picture of the planet. In rapid succession they are fish men, plant men—who have a goddess supernormally teleported from and to Brooklyn by a process which may be like the one that got Ulysses Paxton to Mars, men who reproduce by fission like amoebas, and finally a set of reasonably normal humans who wage "naval" war in gigantic landships.

The backs of the Canaveral jackets, incidentally, are now featuring a series of excellent informal photographs of Burroughs, most of them taken by another son, Hulbert Burroughs. Let's hope they get more permanent form in the biography that Vernell Coriell, publisher of the various Burroughs Bibliophiles newssheets and magazines, is writing. They make it apparent—far better than formal studio portraits could have done—that, like his heroes, Edgar Rice Burroughs enjoyed life.

BACK TO THE STONE AGE

By Edgar Rice Burroughs • Canaveral Press, New York • 1963 • 318 pp. • $3.50

Ace Books, New York • No. F-245 • 221 pp. • 40¢

LAND OF TERROR

By Edgar Rice Burroughs • Canaveral Press, New York • 1963 • 319 pp. • $3.50

SAVAGE PELLUCIDAR

By Edgar Rice Burroughs • Canaveral Press, New York • 1963 • 274 pp. • $3.50

Barring unlikely miracles, these three books do put an end to Burroughs' chronicles of Pellucidar, the physically impossible world inside a hollow Earth, where relicts from the whole history of life on the surface are jumbled together, and there is no Time. They were also, as it happens, all new to me.

As with his later Mars and Venus books, so with Pellucidar: Burroughs had stopped trying to fill out the picture of the worlds he had created, and had settled down to a formula of capture-and-escape with groups of people who are either physically or socially freakish. The Mahars, those intelligent reptiles who outraged the purists but added a great deal of spice to the first Pellucidar adventures, have completely withdrawn from the picture and what reptiles we do meet are stupid and humdrum.

In the previous book of this series Burroughs had tied together two of his series by sending Tarzan to Pellucidar in a dirigible that flew in through a hole at the North Pole. In the course of events a blond German superman, von Horst, became separated from the rest and they returned without him. "Back to the Stone Age" deals in a lively manner with von Horst's efforts to make a place for himself in the Stone Age world. The serial version, published by *Argosy* in 1937, was called "Seven Worlds to Conquer," but I can account for only six—perhaps the seventh is Pellucidar in general. Lieutenant Friedrich Wilhelm Eric von Mendeldorf und von Horst is carried off by a flying reptile, escapes from its crater lair and becomes a slave of the cave men of Basti; heads a successful slave revolt but falls into the hands of the ghoulish Gorbuses, of the Forest of Death; gets out of that mess only to be captured by the Mammoth Men of Ja-ru; puts the Androcles principle to good use by dethorning a rogue mammoth which is duly grateful, only to clash with the horned Bison Men of Ganak; and finally wins the girl and becomes Chief of the much higher-grade cave-dwellers of Lo-har.

A cross-cultural misunderstanding of the sort that also plagued John Carter on Mars and Carson Napier on Venus keeps von Horst and his La-ja apart. The albino Gorbuses, who have dream-memories of crimes committed in lives on the surface of the Earth, are one of Burroughs' weirdest creations, by Freud out of Dante.

"Land of Terror" is a relatively short story, not much more than one of the novelette-length episodes from which several of Burroughs' other books were put together. It appeared in a small edition in 1944, without illustrations. Canaveral has remedied this shortcoming by providing seven excellent ones by Hugo-winning Roy Krenkel, closest to St. John of all the new Burroughs illustrators. In this story we are back with David Innes, the original discoverer of Pellucidar, who has his troubles getting home after having discovered von Horst in Lo-har at the end of the previous book. His captors include the bearded women of Oog, the insane village-living Jukans—who just happen to have possession of Innes' mate, Dian the Beautiful, at the time; the man-eating giants of Azar (Dian is lost again by now, kidnaped by an aristocratic nogoodnik); a nest of giant ants; and the tribesmen of the floating island of Ruva. After a spell as a Ruvan slave, Innes teaches his captors to sail, leads a war party to a rival island, and makes off in a boat, to be rescued on the next-to-last page by none other than Dian. *She* had simply killed her captor when she got tired of him.

The Androcles bit is used again; Burroughs must have liked it. Innes rescued a bogged-down mastodon calf, whose relatives later rescue him from the cannibal giants.

"Savage Pellucidar" is the first of Canaveral's new Burroughs books. It comprises three novelettes from *Amazing Stories* of early 1942—complete with St. John illustrations, praise be—and the title story, discovered last year among Burroughs' unpublished papers (it has since been published by *Amazing*). Here the author is in a satiric mood again. He mocks his Yankee inventor, Abner Perry, whose observation balloon escapes and carries Dian to an unknown Bronze Age city where she is greeted as a goddess. He mocks the religious and political wheelers-and-dealers of Lolo Lolo and its rival town, Tanga Tanga. He also has two lively characters—the spitfire O-aa of the many marvelous relatives, who has become my favorite of all Burroughs' heroines, and the post-centenarian ex-whaler with a taste for brisket of First Mate, who remembers only that his name is *not* Dolly Dorcas. The plot is stereotyped and the people freakish, but O-aa gives the book the spirit of the first books in the series.

THE PIRATES OF VENUS
and
LOST ON VENUS

By Edgar Rice Burroughs • Dover Publications, Inc., New York • 1963 • 340 pages • $1.75

My reasons for giving this Dover paperback reprint full space, rather than noting it in the regular reprint section, is that Dover is illustrating the omnibus with twenty-nine of the illustrations by the late Fortunino Matania. These apparently reproduce all the illustrations from the English serialization of these two Burroughs novels in *Passing Show,* the British weekly.

Dover has also used the serial versions of the two books—the first in Burroughs' Venus series about the adventures of wrong-way Carson Napier, who set out for Barsoom and landed on Amtor (Venus) because he forgot the Moon was there. "The Pirates of Venus" was in *Argosy Weekly* in September and October of 1932 and "Lost on Venus" followed in March and April, 1933. *Passing Show* then ran the two serials end-to-end, in eighteen consecutive issues, from October 7, 1933 through February 3, 1934, with the Matania illustrations.

Matania, who died February 8, 1963 at the age of eighty-one, had a much more literal style than any of the other artists who have become identified with Burroughs, notably St. John. His people look rather like the stars and starlets of Italian spectacle films, both in their solid muscularity and their unabashed undress. (Bikinis were apparently as much in style on Venus in the 1930s as they were in Pompeii a couple of thousand years before, or on the Italian Riviera today.) His monsters, on the other hand, are far more real than any the other illustrators produced.

In his Venus stories, Burroughs was advancing into the territory staked out by his principal imitator, Otis Adelbert Kline. In the twenty years since the first Mars books were written he had become a smoother writer but a slightly more perfunctory one; Amtor is never as real as Barsoom was in the early books. On the other hand, the confidence of twenty years, success enabled him to satirize our own society rather heavy-handedly, especially in Havatoo, the community of science and logic.

Dover and Ace now have paperback editions of the first two Venus books in print. Canaveral has had hardbacks out for some time, and by the time you read this will have completed the series, including—I am told—one unpublished story.

THE EARTH WAR

By Mack Reynolds • Pyramid Books, New York • No. F-886 • 141 pp. • 40¢

This is an expansion of the two-part serial, "Frigid Fracas," published here in Analog just about a year ago. And that was a sequel to "Mercenary," which was here a year before *that.* (Data courtesy of *Science Fiction Review.)*

If you weren't reading Analog a year ago, this novel depicts a future in which the bloody-mindedness of the populace supports full-scale, all-out warfare between industries or management and labor. Arbitration takes place on the battlefield, and the mercenary warriors of these "fracases" are the counterparts of today's TV wrestling and pro football heroes. A disarmament agreement has rolled back the world's armament to the level of 1900, but that allows surprising latitude to an imaginative professional soldier such as Major Joe Mauser.

The first, and superficially most interesting part of the book deals with an attempt to build Joe Mauser up as a public hero instead of the pro's pro he really is. When he weds a pre-1900 machine gun with a pre-1900 reconnaissance glider and gets aerial warfare, the referees come down on him like a ton of bricks—and the second part of the story begins. The action is perhaps less exciting, but the author—who as a roving travel writer knows his Europe well—is making the point that the common ties and values of creative personalities cut across the trivialities of national custom and political ideologies. The prospect at the end is that behind the end to the "frigid fracas" between East and West will be a gentleman's agreement to get on about the business of creative progress for mankind.

EEVALU

By Adam Lukens • Avalon Books, New York • 1963 • 192 pp. • $2.95

I can't help wonder whether ham-handed editing had anything to do with the total fecklessness of this latest adventure with not-really-strange people on far worlds. Adam Lukens has written some of Avalon's best books, but this certainly isn't one of them. People seem to act from no motivation other than natural cussedness, the winged people of Eevalu are simply folks in costume, with no rationalization for their having erected an elaborate civilization inside their planet—other than sensitivity to sunlight, which presumably developed after they holed up. The Earth colony is belligerent and vindictive, and an interestingly warm relationship between a Terran scout and an Eevalu clown, which promises a lot in the first chapters, fizzles away. Jakku the winged man never seems a clown, and Veet Poro, brother of the heroine, is just plain nasty most of the time.

Not only is this a waste of the reader's time; it seems to me a waste of a potentially good writer's time, too.

THE MEN FROM ARCTURUS

By Russ Winterbotham • Avalon Books, N.Y. • 1963 • 192 pp. • $2.95

When science fiction was young, the easy, realistic style with which oldtime newspaperman Russ Winterbotham treats his human characters would have made this story outstanding. Nowadays that kind of competence is to be expected, and the story itself doesn't offer much.

The furry "men from Arcturus" of the title—the Edaphi—are pioneering in a hyperspatial exploring ship and land on a Kansas farm. Rykko, the pilot/villain, is a highly pragmatic galactic con-man who intends to stake out a nice new planet as a real estate investment, on which he can cash in when he returns to overcrowded Vroob. Kintop, an ineffectual government monitor, is along to prevent him from doing just what he intends—exterminate mankind to make way for the Master Race. With no help from a stupid and timorous sheriff, our young farmer-hero foils the plot and gets the girl.

THE MILLION CITIES

By J. T. McIntosh • Pyramid Books, New York • No. F-898 • 1963 • 141 pp. • 40¢

It's a long time since we have had a new book from this Scottish author. This one, published in a shorter form in the British *Satellite* in 1958, is considerably better than much we are getting these days, but not up to the author's own standard.

The "Million Cities" of mankind have grown together until they cover the entire face of the Earth, layer upon layer deep. And mankind fills this vast hive from top to bottom. The welfare state has become monstrous—but a monstrous necessity. Abortive attempts at space travel, to drain off the population pressure, have always failed and have brought reaction against further attempts. And a mysterious secret organization, the Chartists, preys on the idealism of some and ruthlessly murders others.

McIntosh follows the build-up of pressure by deftly interweaving the stories of ten people, all of them somehow concerned with the Chartists but not until the end with each other. Beautiful Jia Hisk, socialite—once in love with Jon Onul, civil servant, who in turn has a young daughter, Pet. Rik and Lorna Pocan, twins, whose friend, Tom Gest, has found a way into space. Senator Wilmington Smith, who has planned a ruthless attack on the Chartists which will be used to force total conformity on the people. The senator's young son. A couple of less important people. In the end, the senator's plan envelopes them all and forces some of them to strike back—the Chartists to schedule his assassination, Ria to put stumbling blocks in the way in spite of her high place in Chartist circles, the spaceship to make its flight—and the true nature of the Chartists, revealed at last, to tie everything together.

Re- and Re-Reprints

THUVIA, MAID OF MARS

By Edgar Rice Burroughs • Ballantine Books, New York • No. F-770 • 1963 • 159 pp. • 50¢

THE CHESSMEN OF MARS

By Edgar Rice Burroughs • Ballantine Books, New York • No. F-776 • 1963 • 220 pp. • 50¢

THE MASTER MIND OF MARS

By Edgar Rice Burroughs • Ballantine Books, New York • No. U-2036 • 1963 • 160 pp. • 50¢

Ballantine has gone back and picked up the middle titles in the Mars series; No. 7, "Fighting Man," is all that's left. "Thuvia" has by all odds the worst cover illustration in the series, and "Master Mind" a very good one.

THE BEST OF SCIENCE FICTION

Edited by Groff Conklin • Crown Publishers, New York • 1963 • 440 pp. • $1.95

In a new introduction Groff Conklin points out that the original—and complete—version of this anthology was the first science-fiction collection on the market after Hiroshima. Eighteen stories have been dropped in this paperback abridgement—four, he says, because they have gone out of date since 1946. The twenty-two stories remaining include such classics as Kuttner's "The Piper's Son," Sturgeon's "Killdozer," and Heinlein's "Universe."

THEY WALKED LIKE MEN

By Clifford D. Simak • Macfadden Books, New York • No. 50-184 • 1963 • 176 pp. • 50¢

Paperback of the 1962 hardback novel about the invading bowling balls—an utterly new technique for taking over the Earth, but not in the league with the author's "City" or his new "Way Station."

GOD ISN'T DEMOCRATIC

continued from page 7

That all men always are and always will be subject to the Will of God.

Now note one factor here very carefully: It is totally unnecessary to raise any question of Faith, or factual reality of the above concepts to be able to analyze the purely logical consequences.

We have two sets of postulates:

1. Democracy holds that the Will of the People is the Supreme and Final determining factor in what is Right, what Should Be Done. That the Will of the People should *direct* executive officers—that the people should not be directed by their leaders. That any Entity who seeks to oppose or suppress the Will of the People is a—vicious, evil, destructive—tyrant.
2. Religion holds that the Will of God is the Supreme and Absolute determining factor in what is Right, what Should Be Done. That anyone opposing the Will of God will be punished by God, unless he truly mends his ways—and that God, being omniscient, is not going to be deceived.

Now religious freedom, in its true sense, does not deny any of the postulates of religion. Moslem, Christian and Jew—Protestant and Catholic—can all agree on those basics. Religious freedom simply acknowledges that man, not being divine and omniscient, does not know-for-sure *what* the Laws of God actually are. The practice of that degree of humility is something men attained only relatively recently, very bloodily, over many centuries. It amounts to recognizing, finally, that while God's laws are indeed absolute—men's understanding of them isn't.

The religious freedom being sought by the men who founded America was simply that proposition; the right to obey *what they believed* the Absolute Laws of God were.

What we have in America today, however, is something quite different. It doesn't hold simply that no one group can know-for-sure the Absolute Laws of the One God—it holds that if there is a God, there should not be, for He would be an absolute—vicious, evil, destructive—tyrant, since *any* entity seeking to overrule the Will of the People is vicious, evil, and to be rejected.

This attitude is a necessary consequence of the basic postulates of Popular Democracy; the Will of the People is the absolute source of Right, and all tyrants are, *de facto,* evil. Therefore, the Will of God cannot be tolerated, because it would be tyrannical, and evil since it opposed the Will of the People.

Moreover, there are many personal aspects of an acceptance of religion that become acutely discomforting to many people. God has been called "The Great Snoop"; those who would prefer to have their acts and doings very completely private do not find the idea of an all-knowing God at all comfortable.

Then the concept that there are absolute laws that are *not* "just matters of opinion, and my opinion's as good as anyone else's!" doesn't sit well with another type of personality.

God, too, is called The Great Judge—and Democracy has a much kindlier concept; that no one should judge his fellows. This business of a Great Judge who sits in unarguable judgment, as Judge, Jury, and Prosecuting Attorney—complete with built-in and inescapable truth-perception — turns many more away from the idea of such a tyrannical system toward the kindlier ideas of Democracy-without-end.

The churches continue to prosper—but one of the most prosperous I know of is a suburban church where Sunday is the community fashion show and social get-together. Church and Courts alike have recognized the temper of the people, the popular belief that ruling tyrants are inherently evil, to be rejected—an image to be softened. Not a stern, just, all-powerful but merciful King, but a jolly politician type, who recognizes the Will of the People, and does favors for the Right People.

That particular school of theology has been tried by other cultures, other times in other places. It doesn't work. The culture comes apart at the seams—for the essence of that form of "theology" is that there is no hard discipline, no real necessities, in the Universe.

For the revolt is not against God—but against the concepts of discipline, of forces in the Universe greater than human will, and mass opinion. The delusion that popular opinion is the determining force in the Universe, that what The People want is, thereby, Right is a basic tenet of popular democracy as now taught.

It has seemed to me that one of the reasons that so many people dislike Science—find scientists "cold and inhuman"—is that Science consists of studying and recognizing the factors in the Universe that are not subject to popular democracy, are *not* a "matter of opinion," and partake, remarkably, of the characteristics ascribed, by theology, to the Will of God! The Laws of the Universe are quite absolute indeed—and ruthlessly just. Obey them scrupulously, and they work for you; defy them, and you get crushed quite casually, without the slightest bitterness, or anger—or concern.

The scientist, directly concerned with those absolutes, doesn't have the easy, human willingness to give a little—stretch a point for a friend—that the politician understands. He acts almost as rigidly unyielding as an old-time dedicated priest.

Perhaps there is no God after all.

But there is One Universe, and its laws are absolute, unswerving, unyielding, and enforced on us without argument.

The danger to a nation, to a people, is in the idea that the Will of the People can legislate away the necessity for discipline, the necessity of recognizing there are greater and more important things, than human wishes.

Abolishing God may not be quite as simple as the people would like.

It may be that not even the Supreme Court has jurisdiction in that area—that there really is a higher Court that will overrule it. ■ THE EDITOR.

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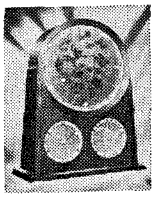

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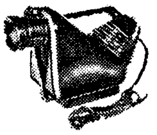

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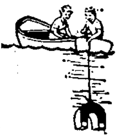

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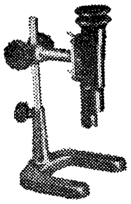

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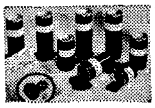

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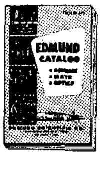

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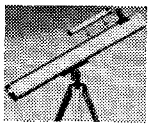

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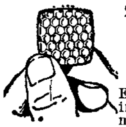

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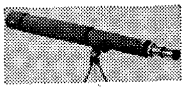

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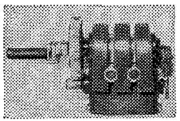

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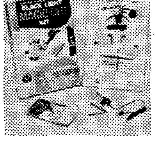

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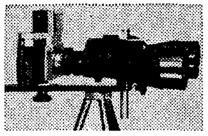

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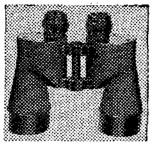

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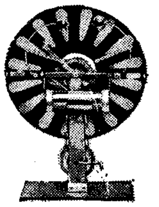

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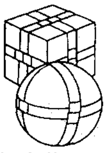

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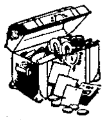

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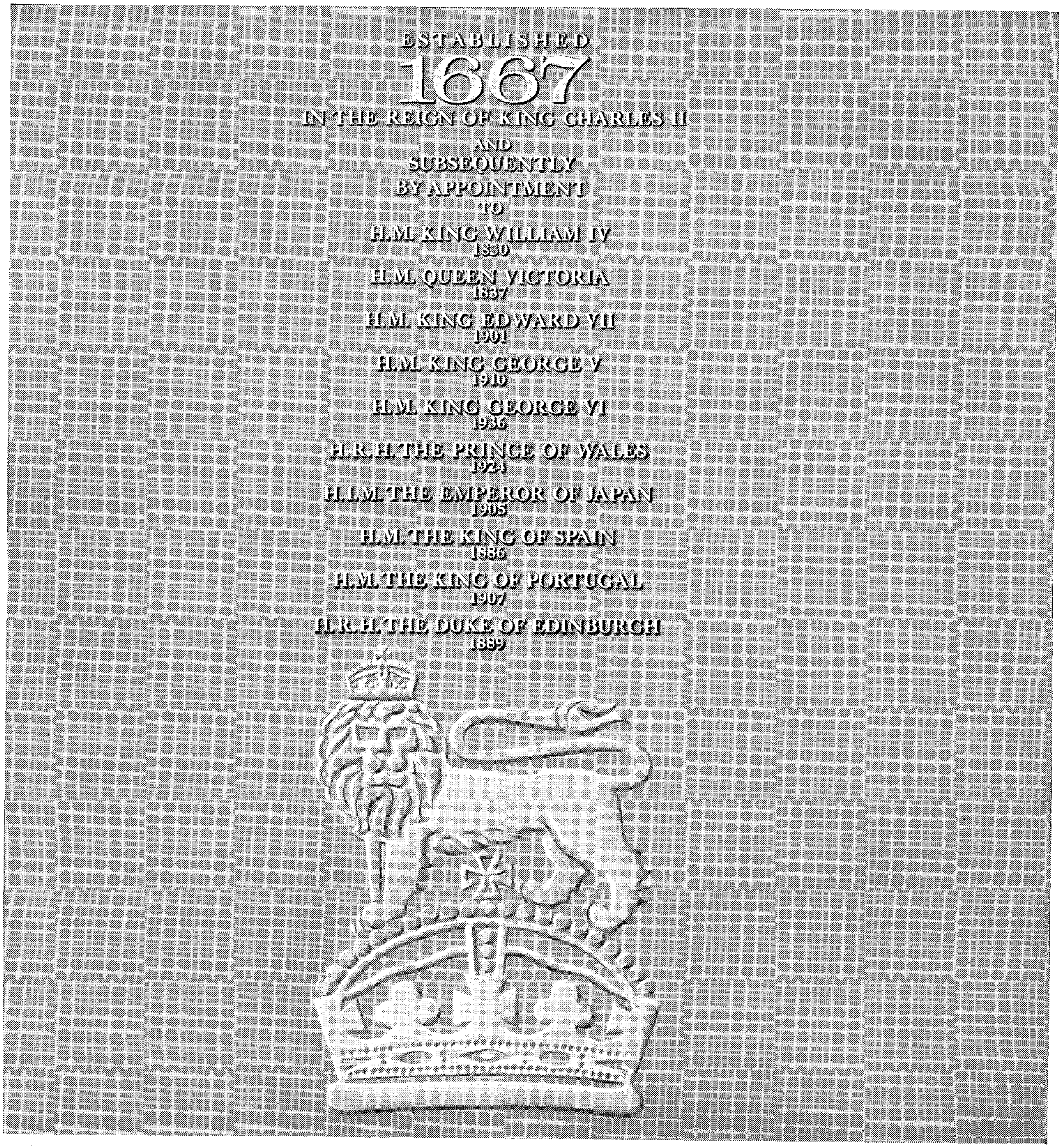
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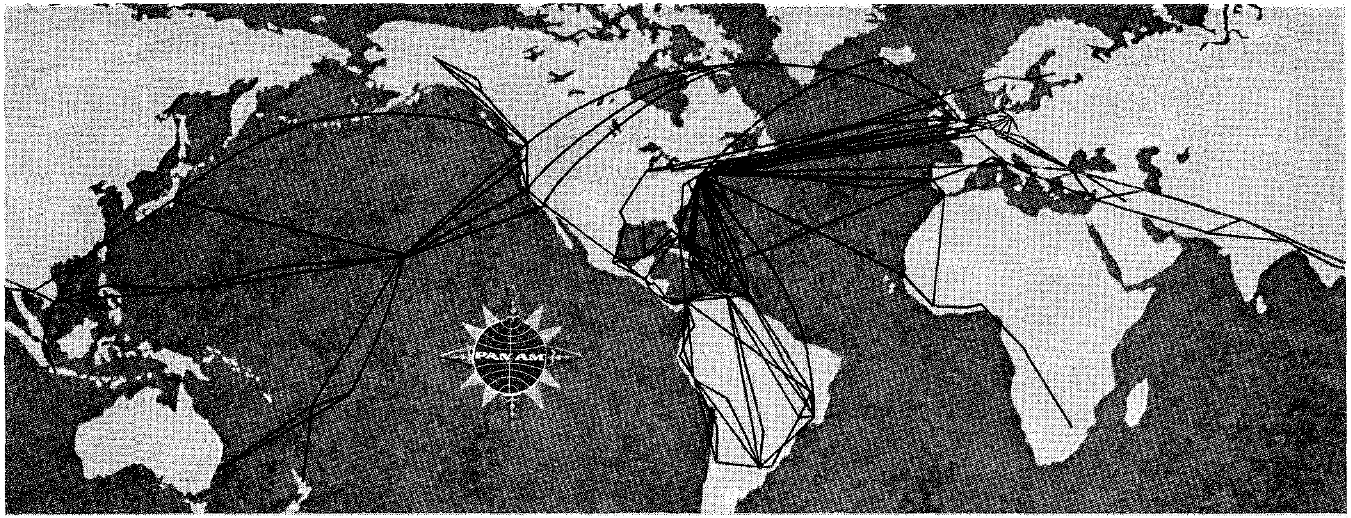

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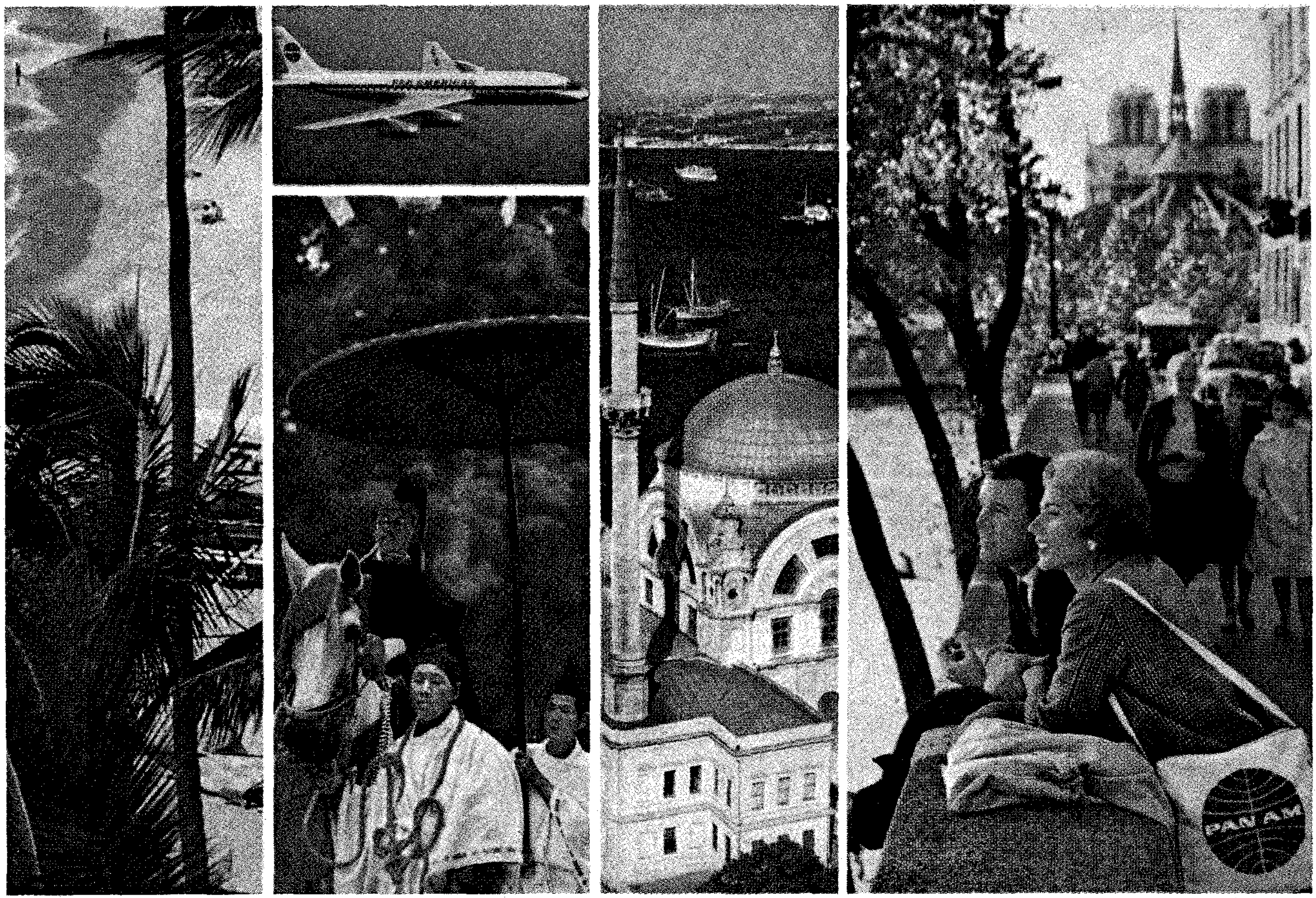

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